

The Iron Age

A Review of the Hardware, Iron and Metal Trades.

Published every Thursday Morning by DAVID WILLIAMS, No. 83 Reade Street, New York. Entered at the Post Office, New York, as Second-Class Matter.

Vol. XXV: No. 19.

New York, Thursday, May 6, 1880.

\$4.50 a Year, Including Postage.
Single Copies, Ten Cents.

A New Drawing Press.

Messrs. Bliss & Williams, Plymouth and John streets, Brooklyn, N. Y., have just completed a new press, which they call their No. 3½ Drawing Press. It is designed for a range of work up to 14 inches in diameter and 4 inches deep, and will take an eight-quart milk pan down at a single stroke. It will do all sorts of work, such as covers, dippers and pans, up to ten quart and not more than 4 inches deep. The opening in the blank holder is 14 inches in diameter.

The die is worked by a crank, and the blank holder by two cams set upon the crank arms, or perhaps, to be more clear, the crank arms are let into the cams. This shortens the distance between the pillow blocks by several inches and greatly adds to the strength of the shaft. These cams have a pair of rollers above and below them, held in place by cross arms and rods, shown in the engraving. By means of these the blank holder is carried down upon the blank, held fast until the press makes its stroke, and then raised and held stationary through the remainder of the stroke. The blank holder itself is a hollow cylinder with wings on the sides, which run in guides bolted to the uprights of the frame. Inside of this blank holder are another pair of guides, in which the tool holder itself works. This arrangement makes the press very compact, and gives, at the same time, ample opportunity for making the proper adjustments. The die holder is driven by a steel connecting rod from the main crank. This portion is adjusted by means of a screw and jam nut on the rod. The lower connection is a ball and socket joint, arranged so that if any lost motion should appear, it may be easily taken up. Adjustments of the blank holder are made by means of nuts upon the four rods by which it is driven. The press is geared seven to one, the large wheel being 60 inches in diameter and the pinion about 8 inches. The shafts are of steel, and upon the lower one, next the fast and loose pulleys, is a 45-inch fly-wheel, which weighs about 750 pounds.

Cams, rollers and shafts are of steel, and steel is used wherever it can be done with advantage. This, taken in connection with the compactness of the design, makes the press very stiff. Thus the distance between the main bearings is only 14 inches. Of this 6 inches is taken up by the two cams, and the crank is 6 inches long, so that practically the 3½ inch steel shaft which does the work has only 2 inches which is not supported or reinforced in some way. The frame itself is very strong and the strains are taken in very direct lines. A friction clutch—seen at the left of the main or crank shaft—serves to stop the press when thrown out of gear. The driving pulleys are 6-inch face by 20 inches in diameter. The treadle is arranged so that when the foot is placed upon it and at once removed, the press will make one revolution and stop with die at the top of the throw. The crank has 8 inches throw, while that of the cams is 4 inches. Bronze bearings are used when they are needed. The workmanship throughout is of the best character. All the parts are made of ample strength, which involves using a large surplus of metal in the frame. In all respects the machine is well calculated for the purpose for which it is intended.

METALLURGICAL NOTES.

THE ESTIMATION OF CARBON IN STEEL.

Mr. James W. Westmoreland, A. R. S. M., of the Bowling Iron Works, Bradford, writing to the *Chemical News*, says that M. Sergius Kern impugns the accuracy of the color test for the estimation of combined carbon in steel, and Mr. W. D. Hermann, in advocating the direct combustion process, states the general opinion of chemists that the color test is not accurate. Mr. Westmoreland continues: The objections to the direct combustion process are—that the steel is required in a fine state of division, and the uncertainty as to the completeness of the reaction, while the time required by any combustion process would prevent its regular use in steel works, where it is not unusual to test from 30 to 50 samples daily. Having used the color test extensively for some years, I find that, in most cases, the results obtained by it agree well with those obtained by other processes—that concordant results are obtained by analysts working independently on the same sample, and that discrepancies which arise are due more to errors or inexperience than to any defect in the method. In order to compare the processes I was requested to examine by color test a series of samples of steel in which the carbon had been estimated by combustion (between 60 and 70 samples were examined), the greater number of the experiments being made in the year 1876, with others at intervals up to the present time. The following are samples of the results obtained in 1876:

CARBON PER CENT.		
A.	B.	C.
1.....	0.285	0.280
2.....	0.340	0.340
3.....	0.158	0.158
4.....	0.563	0.532
5.....	0.147	0.122

The results in column A were obtained by combustion, the steel being dissolved in a solution of chloride of copper, &c., the separated carbon being finally burnt with oxide of copper in a stream of oxygen gas; this process, although tedious, is very accurate. The results in column B were obtained by myself, using the color test, in the

Bowling laboratory. The results in column C were obtained by the color test in the laboratory of a South Wales steel works. The following experiments were made in May, 1878:

CARBON PER CENT.		
Combustion.	Color Test.	
6.....	0.355	0.35
7.....	0.515	0.50
8.....	0.189	0.19
9.....	0.29	0.27
10.....	0.415	0.42
11.....	0.41	
12.....	0.05	under 0.10
13.....	0.62	0.67

The combustions were made as before, and the color estimations by myself, then engaged as chemist to the Rhymney Iron and Steel Company. The sample No. 11 shows one of the defects of the color test—that it cannot be used for estimating very low percentages of carbon in steel, and, on the other hand, its indications with high percentages are not very exact. For steel works' pur-

poses, however, where estimations ranging from 0.10 to 1.00 per cent. combined carbon are required in large numbers and quickly, it is invaluable, taking but little time, and giving results agreeing well with those obtained by other methods.

M. POURCEL ON THE THOMAS & GILCHRIST PROCESS.

M. Pourcel, the eminent metallurgist of the Terrenoire Works, has read a second paper on the Thomas & Gilchrist process before the Soc. de St. Etienne. Aside from his theory regarding the elimination of the elements of the pig at different periods, a theory disproved by the Eston engineers, M. Pourcel held that an overblow would always be characteristic of the Thomas & Gilchrist process, because the phosphorus eliminated is carried into the cinder in the shape of phosphate of iron. M. Pourcel's arguments appear to us rambling and evasive, but as he gives some interesting details which have not yet been published in this country, and some of his criticisms are well taken, we will briefly refer to them. M. Pourcel calls attention to the fact that the composition of the spiegel-eisen employed at Hoerde is not given. Using Herr Massenez's own figures, he shows that the slight loss of metal in the Hoerde experiments cannot be due to the use of pig low in silicon, because

the loss was greater when a richer pig was blown than when a metal lower in silicon was operated upon. He quotes the following interesting figures by Stead, to show that the formation of the basic cinder only takes place during the afterblow, and that a low percentage of silicon is chiefly valuable as affording the means of considerably shortening the latter. Mr. Stead's analyses are highly important, also, as showing clearly how the various elements are affected during different periods of the blow.

ANALYSES OF METAL AND CINDER OF PHOSPHORIC PIG BLOWN IN A BASIC CONVERTER.

Metal.

Pig.....

Aft. 3 m.....

Aft. 6 m.....

Aft. 9 m.....

Aft. 12 m.....

Aft. 14½ m.....

Aft. 16½ m.....

Steel.....

Mn. Car. Si. Sul. Phos.

0.71 3.57 1.20 0.06 1.57

0.62 3.68 0.81 0.06 1.60

0.56 3.40 0.28 0.06 1.63

0.38 2.35 0.05 0.05 1.43

0.27 0.88 0.01 0.05 1.42

0.12 0.07 tr. 0.05 1.22

0.10 tr. 0.05 0.14

tr. 0.05 0.08

0.27 0.124 0.03 0.04 0.22

equivalent for equivalent. There can, however, be little force in M. Pourcel's argument when, at the conclusion of it, we find him helpless before the facts directly contradicting his conclusions.

THE EXTRACTION OF OIL AND AMMONIACAL LIQUORS IN COKING.

Mr. Henry Aitken proposes, in a paper read before the North of England Institute of Mining and Mechanical Engineers, to utilize the oils and ammoniacal water produced in the manufacture of coke, and he has for that purpose constructed a modified coking oven, the principal features of which are that three flues are made in the bottom of the oven, which are covered with perforated tiles. They meet near the door, and at their junction is inserted a pipe, which is connected with the condensers, the action of which is assisted by a mechanical exhauster or a steam jet. The upper portion of the oven is surrounded by a circular pipe,

derived from the water put in to cool the coke of the previous charge, and converted into steam as the coking proceeds. Mr. Aitken states that the coke made is more dense, and is obtained in larger pieces than that manufactured in the ordinary way, and that the yield is increased about 1½ per cent. He says that some of the dry non-coking Scotch coals make a fair coke in this manner of working.

We may add that a similar object has been attempted, with some success it appears, by M. M. Simon & Carvès. The Terrenoire Company have about 200 of these ovens at work at Besseges, Gard, France, and we understand the commercial results have been very satisfactory. At Besseges these objects are said to be so perfectly attained that the theoretical yield of coke is obtained from the coal, being in their case 73 per cent. The quality of the coke is pronounced very good. The collection of the tar and ammoniacal liquor is also stated to yield a profit of from 3s. to 4s. per ton of coke made. These ovens are oblong chambers about 16 feet long, 2 feet 2 inches wide, and 5 feet 9 inches high. They are charged by two openings at the top, and there are flues underneath the bottom and round each side, in which the gases which have been deprived of their tar and ammonia are burnt. No air is admitted into the oven during the coking operation. The coke is discharged by a steam ram, and at once slacked with water in the usual manner. We may add that the latter is a feature which it appears to us has not been adequately provided for in Mr. Aitken's design.

THE CASSON-BICHEROUX FURNACE.

The system of burning fuel in direct-firing gas furnaces appears to be gaining ground abroad for puddling and heating, and the results of its application, as reported from England and Belgium, explain the favor with which it is meeting. At Ougrée the consumption of coal has been reduced from 18 or 20 cwt. to 12 cwt. per ton of iron, while at the Round Oak Works, Casson-Dormoy puddling furnaces fired with gas consume 12 cwt. of slack per ton of iron, against 27 cwt. of lumps with the ordinary furnaces. The results are highly favorable with heating furnaces also. A test made at the Round Oak Works, to show the economy of fuel and the reduction of the waste of iron, resulted as follows:

	T. cwt.	qrs.	lbs.
Iron put into furnaces.....	22	13	1 24
Finished iron rails rolled.....	19	4	3 0
Ends of bars.....	2	1	3 7
Waste of iron in furnaces.....	1	6	3 17
Waste of iron, including ends.....	3	8	2 24
Fine slack coal consumed.....	4	13	0 0
Slack per ton of iron rolled.....	0	4	3 3½

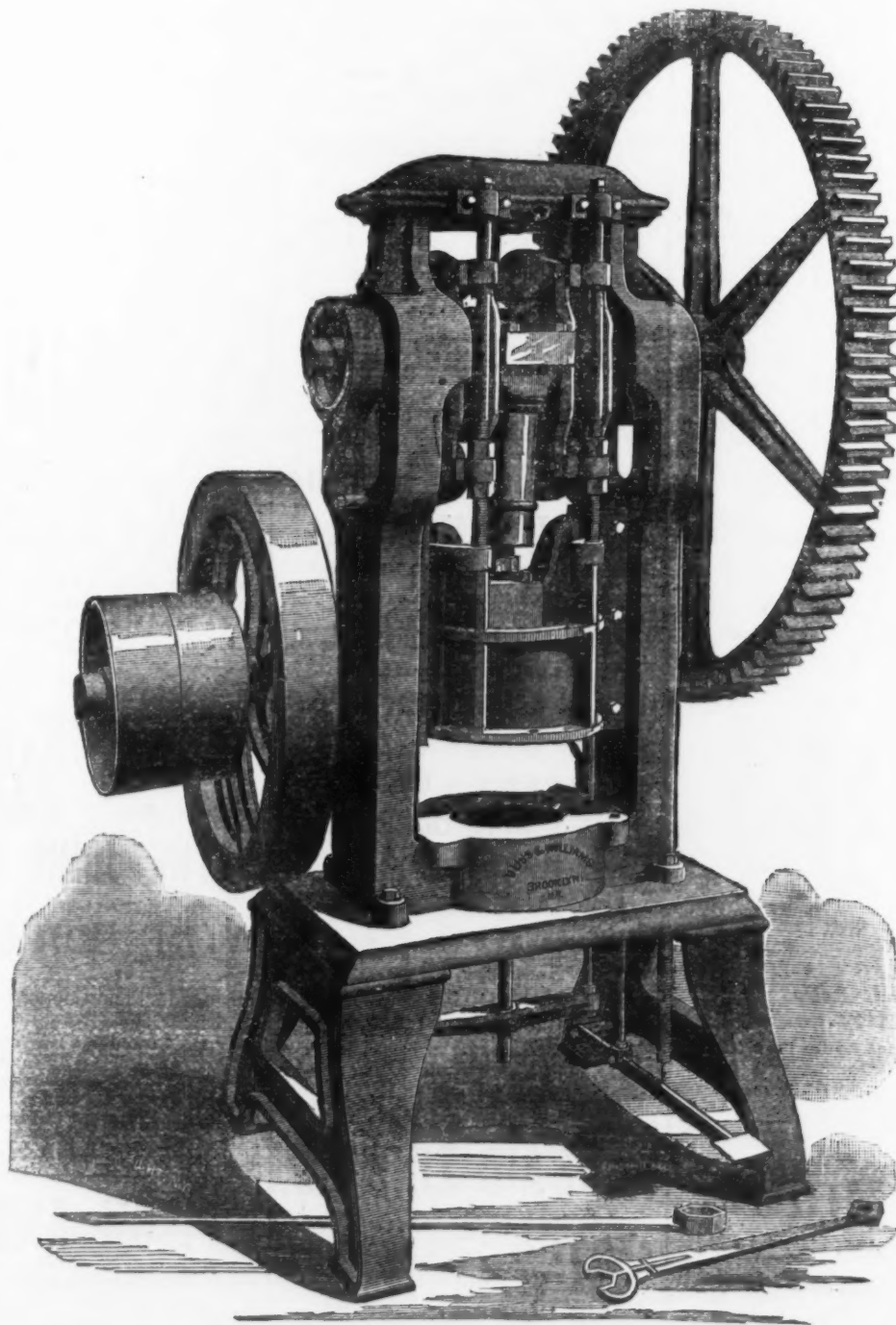
The percentage of waste of iron, including ends, was 15.15, but the actual waste was only 5.93 per cent. Mr. B. C. Lauth, of Philadelphia, is the agent for the introduction of this furnace into the United States.

THE EFFECT OF FORGING AND ANNEALING STEEL.

M. D. Chernoff, whose labors at the Abouchoff Steel Works are meeting with such general appreciation by metallurgists, has conducted an interesting series of experiments on the effect of forging and annealing steel upon its mechanical properties. The results of this work are laid down in the following table, published in Mr. William Anderson's translation of M. Chernoff's paper contributed to the Imperial Russian Technical Society. The test pieces were from 5.91 to 9.84 inches long and 0.49 inch in diameter.

	Elastic limit, tons per sq. inch.	Ultimate strength, tons per sq. inch.	Elongation, per cent.	Analysis, C. Si. Mn.
1. Not forged or annealed.....	16.38	39.37	4.0	0.70 0.07 0.54
2. Annealed.....	24.03	46.59	8.0	
3. Forged Bessemer.....	17.71	39.37	16.5	0.43 0.04 0.30
4. Forged Bessemer.....	18.43	40.02	15.5	0.35 0.01 0.12
5. Forged an- (annealed) Bessemer.....	16.40	42.65	22.0	0.45 0.10 0.30
6. Forged.....	18.43	45.51	14.0	
7. Unforged an- (annealed) steel.....	24.93	46.59	3.4	0.57 0.24 0.39
8. Unforged an- (annealed) steel.....	26.24	53.15	5.6	0.72 0.22 0.61
9. Ordinary.....	36.74	56.74	9.4	
10. Annealed.....	18.59	30.61	3.4	
11. Forged and an- (annealed).....	20.83	34.61	6.7	0.54
12. Forged and an- (annealed).....	21.00	42.00	16.0	
13. Forged and an- (annealed).....	17.39	32.15	18.1	

Specimen No. 1 was taken from an 8-inch Bessemer steel shot made by the Abouchoff Works. No. 2 was Bessemer gun steel, forged, two samples being tested, and No. 3 was forged and annealed Bessemer steel from the rings of a 9-inch mortar, the figures given being the range of a large number of samples. No. 4 was taken from a forged 11-inch shot manufactured by Krupp, while No. 5 gives the range of tests of unforged annealed 9-inch shot made at Terrenoire. No. 6 was unforged annealed 9-inch shot manufactured by Inoskoff, while the samples under No. 7 were crucible steel, compressed while fluid by a pressure of 2100 atmospheres, and No. 8 was compressed steel worked at 1200 atmospheres pressure and then forged and annealed. From these figures and from the well-known experiments at Terrenoire, M. Chernoff concludes that any kind of pressure to improve the mechanical properties of steel is useless. The whole question lies in the skill of the founder. The low mechanical properties which distinguish unannealed cast steel, whether compressed or not, from annealed or forged steel, can be explained by its coarse crystalline structure, by the presence of local cavities, and especially by



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poses, however, where estimations ranging from 0.10 to 1.00 per cent. combined carbon are required in large numbers and quickly, it is invaluable, taking but little time, and giving results agreeing well with those obtained by other methods.

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from which a number of branches conduct blast into the oven. For the first 24 hours the temperature of the gases issuing from the bottom is 300 degrees; in the next 12 hours it gradually increases to 600 degrees, and in a like period to 1000 degrees. At present the non-condensed gases are used for lighting, but as their illuminating power is inferior, while their calorific value is considerable, it is proposed to force them into the oven again above the level of the coke, to be used there to create heat to carry on the coking. The largest quantity of oil yet obtained with an imperfect apparatus has been 11 gallons of oil per ton of coal, the specific gravity of the product varying from 0.925 to 1. The usual quantity of ammoniacal liquor recovered is about 30 gallons per ton of coal, and the specific gravity is 2 Twaddell. This, however, it is stated, does not correctly represent the amount of ammonia in the liquor. One sample tested was taken from the working of six ovens, and the analysis showed that it contained 174 grains of ammonia per gallon of water, or 9.7 pounds of sulphate of ammonia per 100 gallons. Another sample was found to contain nearly twice this amount, or fully 5½ pounds of sulphate per ton of coal coked. The quantity of ammoniacal water got per ton of coal charged is in excess of what is in the coal, the excess being

Mr. Stead's figures show a strong reduction of phosphoric acid by the final addition of spiegel-eisen, and M. Pourcel seeks to account for the fact that this reabsorption did not take place at Hoerde, by pointing to the fact that the composition of the Hoerde cinder, as given by Herr Massenez, shows it to be so little fusible that the reducing carbonic oxide cannot attack the phosphates, and that therefore it is really by physical means that the reabsorption of the phosphorus is avoided, rather than by the chemical action attributed to the lime. Referring to Herr von Ehrenwerth's calorific studies, M. Pourcel holds that neither silicon nor phosphorus exists separately in the pig, but as silicides and phosphides. These do not, as Troost and Hauteffeuille have shown, at least as far as the silicides are concerned, possess anything like the calorific power of the elements separately, and M. Pourcel therefore protests against any attempt to replace silicon by phosphorus as a calorific element,

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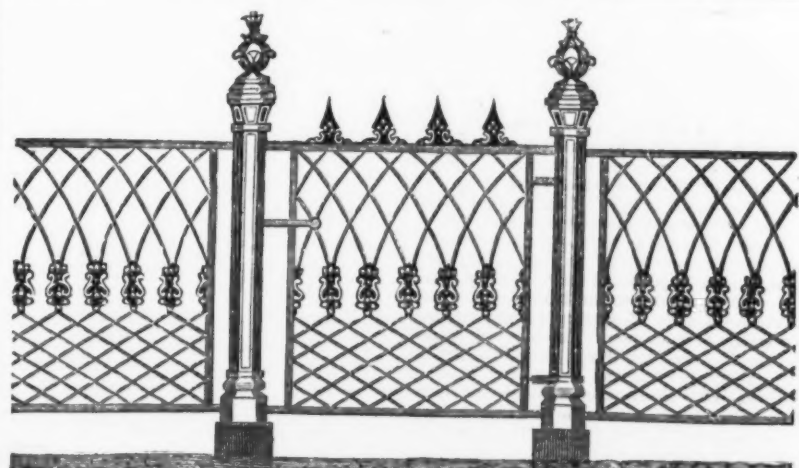
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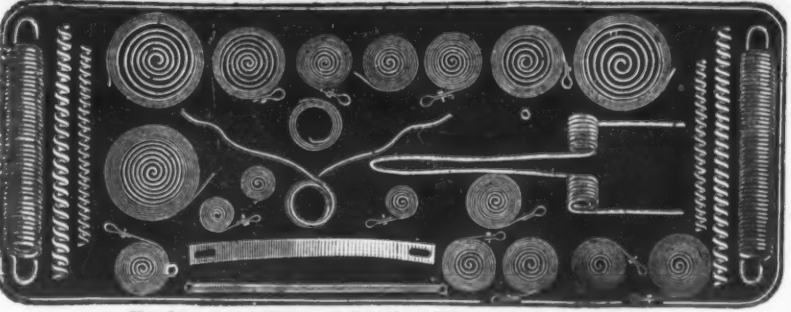
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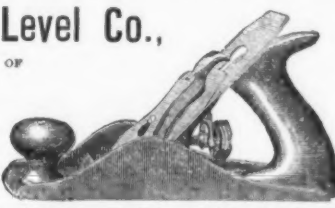
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granulation. This latter defect is only partially removed by annealing, which may be explained by the circumstance that the surfaces of contact of the grains are separated by varying distances, and that these distances always exceed the limits within which cohesion acts at ordinary temperatures, but not in general its limits at a bright red heat.

An Improved Automatic Power Hoist.

In all modern warehouses, factories and mills the primitive and expensive method of hoisting by hand is giving way to modern machinery, which combines greater durability and safety, with more ease and economy in working. Among the apparatus recently introduced is that of Messrs. Clem & Morse, of Philadelphia, which contains some features worthy of attention. The main points may be gathered by referring to the accompanying illustrations, which represent the hoisting apparatus used in connection with their elevators. The hoisting rope is wound over a grooved drum, which is run by a worm and gear from the pulley shaft. The latter is fitted with three pulleys, of which the two outer ones are loose, while the middle one is fast. The belt for causing the elevator to ascend runs on the left-hand loose pulley while the one for causing the descent is running on the other. Either of the belts is shifted to the fast pulley when it is desired to raise or lower the elevator. This shifting is performed automatically by the apparatus, by a device shown in the engraving.

regular lubrication, by having the hub of the pulley cored out so as to admit of the introduction of rings of fibrous cloth encircling the shaft. A supply pipe is introduced through the hub of the pulley, so that the cloth rings are constantly fed with a moderate supply of oil. The rings are sewed together so that they form a compact substance, thus avoiding all winding around the shaft, as is the case when waste or stringy materials are used. They also use self-oiling journals, or bearings, for the cable carrier sheaves at top of building.

How Our Manufacturers Learned to Make Steel.

The London Engineer prints the following absurd story at second hand, and ventures some comments of its own which are as absurd as the story:
A curious letter is published in the Sheffield Daily Telegraph, signed "W. Clifford." It contains some allegations which, if true, have remained unknown to nearly every Sheffield man until now. Mr. Clifford states that the American Government imposed a prohibitory tariff upon Sheffield steel, as a reprisal for the sympathy our government and people gave to the Southern States in their war of rebellion; and he goes on to say that a commission of the United States Customs Department which came to Sheffield, practically put an end to what remained of the steel trade with America, by handing over to the American manufacturers the

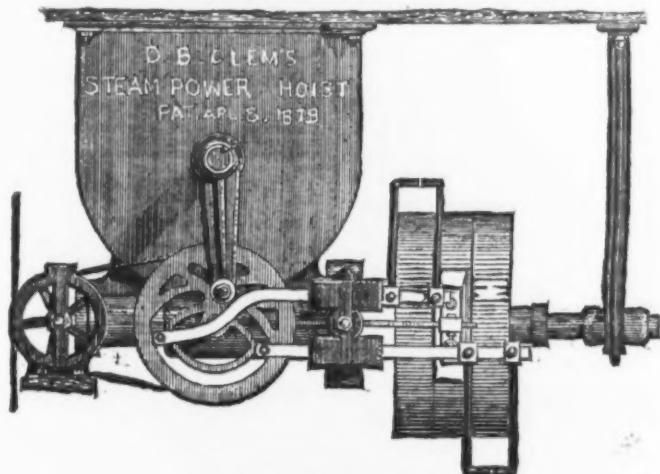


Fig. 1.—Side Elevation.

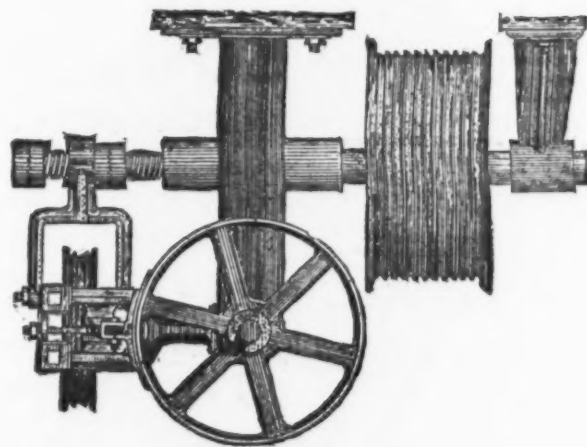


Fig. 2.—Front Elevation.

THE CLEM & MORSE POWER HOIST.

ing. It will be noticed that a pulley is provided the side of which has a concentric slot, ending, after occupying a segment of the circle, in two cam grooves. Within this slot run two rollers attached to a lever, which, after passing through a guide block, carry at their other end the bear rods. It will be understood that by turning the slotted pulley in one direction, one of the levers will be drawn toward the center of the slotted pulley, by being free to move in the branch slot, while the other will remain stationary, because its roller slides along in the concentric slot. Let us assume that the slotted pulley is turned from right to left, and it will be seen that the lower lever and bear rod will be drawn from right to left, thus shifting the belt from the left-hand loose pulley to the middle fast pulley. An accidental reaction of the slotted pulley is guarded against by a simple device which is not shown in the engraving. In the hub of the slotted pulley is a curved slot, in which a roller attached to one end of a lever freely slides. The other arm of the lever carries a brake shoe, which is applied to the fast pulley automatically in such a manner that it acts as soon as neither of the driving belts is on the central pulley. The movement of the slotted pulley is effected automatically, so that the shifting of the driving pulleys is brought about as soon as the elevator reaches its destination. In order to effect this, a traveling clutch section, having a yoke extension, is mounted on the winding drum shaft. When the elevator cage or platform reaches the limit of ascent or descent, this traveling clutch section meets and engages with one of two collars, which are, as shown, constantly in engagement with other fast collars. This causes the clutch section to revolve with the drum shaft, and makes it move the slotted pulley so that the belt is shifted and the brake is put on. For safety sake this automatic stop, which can be set at any point, is supplemented by an ordinary stop, a part of the mechanism of which is shown in our illustration. The manufacturers have used all means to make this ingenious arrangement reliable, durable and efficient. They inclose the driving worm, which is made of the best steel and run at a high speed in oil, in an oil-tight housing. To overcome the annoyance and serious trouble occasioned by loose pulleys when not kept properly oiled, they have adopted a device to secure self-oiling, or constant and

hitherto sacred knowledge of mixtures and manipulation which had made Sheffield steel famous. "I was informed," says Mr. Clifford, "by gentlemen representing Sheffield firms in New York, that it is a fact that about the time or just before Dr. Webster came to Sheffield as United States Consul, a commission, consisting of Gen. Storey, U. S. A., and Col. Gorrough, sat at the Victoria Station Hotel, and called before them Sheffield manufacturers of steel, doing business in New York, and required them under threat—implied or actual—of seizure of books, breaking open of safes, and general stoppage of business in New York, that they should tell them how they made steel, ostensibly for the purpose of ascertaining its value at New York." Mr. Clifford goes on to ask if it is not true that steel makers were required to state the brands of iron they used, the price, the place of purchase, the freight, &c., coke used, quality, quantity, price, &c.; labor, amount, value and details, the structure of furnaces, and even to tell the physics used and the grade of steel resulting. Mr. Clifford asks further if it is true that "the commission visited manufacturing, accompanied by American steel manufacturers, who saw unofficially, but with practical eyes, every department of work in the steel furnaces." Mr. Clifford's inquiries are pertinent, and if they are founded on fact, they will form a curious revelation of how affairs were worked at a time when the States were undoubtedly "sore" against this country; but all stories of this kind must be taken with reservations.

Brown Tint for Iron and Steel.—Dissolve, in four parts of water, two parts of crystallized chloride of iron, two parts of chloride of antimony and one part of gallic acid, and apply the solution with a sponge or cloth to the article and dry it in the air. Repeat this any number of times, according to the depth of color which it is desired to produce. Wash with water and dry, and, finally, rub the articles over with boiled linseed oil. The metal thus receives a brown tint and resists moisture. The chloride of antimony should be as little acid as possible.

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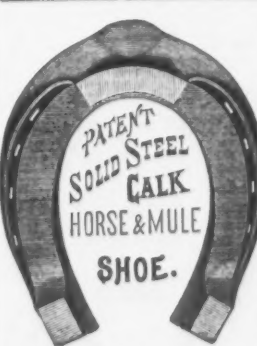
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Manufacture of Pig from Imported Ores in the North of England.

It has to a large extent escaped notice that the growth of the crude iron trade in the Cleveland and Durham district, is contributed to in increasing quantities by the smelting of iron from other than Cleveland ironstone. The first time, says the *Engineer*, that the statistics of the Cleveland ironmasters distinguished between the two kinds of iron—that made from native and that from imported ores—was in the beginning of 1878, when, for the month of January, out of a total production of pig iron of 182,839 tons, the production of other kinds of iron than Cleveland was 23,803 tons, or less than an eighth of the total. In that year the proportion grew; for the month of April, out of a total output of 164,674 tons, the output of other than Cleveland iron was 27,867 tons—or about a sixth of the total. At that time some 17 furnaces were engaged in the production of hematite and other kinds of iron from imported ores. In August of the same year it was reported that the production was for that month 168,492 tons, of which the amount of 30,174 tons was other than Cleveland iron, or a little under a fifth of the whole, the furnaces engaged in the production being 19 in number. But before the end of the year there was a change, the number of producing furnaces being reduced to 16; the total output to 167,160 tons for October, of which the 16 furnaces produced 29,858 tons, or about the same proportion. At the beginning of 1879 the total output was 168,667 tons, and that of 16 furnaces producing other than Cleveland iron was 29,609 tons. Again in May the total output of all the furnaces in the district was 78,271 tons, the effect of the Durham strike being felt, and that of the 13 furnaces producing hematite and spiegeleisen was 9735 tons, or about one-eighth. At the end of the year the total output was for the last month 180,187 tons, and 16 furnaces produced 32,128 tons of other than Cleveland iron. And in the latest month for which the statistics are procurable, out of a total production of 181,976 tons, there was from 17 blast furnaces, an output of 34,072 tons of other than Cleveland iron, so that despite the increase in the production there has been within the last two years a more than concurrent, if an irregular, increase in the production of hematite iron and spiegeleisen. And with the increased home consumption of this class of iron in the South Durham and Cleveland district, and the augmented demand for hematite iron for use in other parts of the district, it is probable that others of the idle blast furnaces will be put into operation to produce this class of iron.

Cushioning the Reciprocating Parts of Steam Engines.

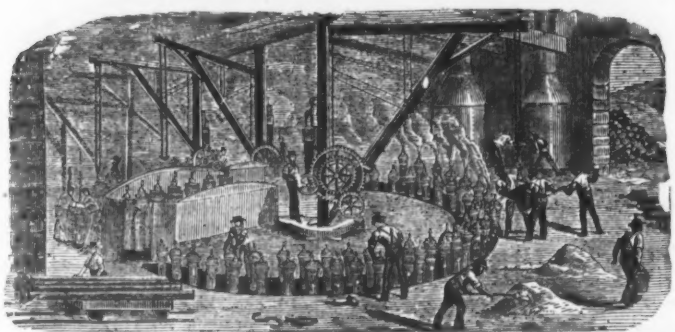
Mr. Charles E. Emery, in a discussion of a paper by J. W. Hill on the cushioning of the reciprocating parts of steam engines, sums up the principal considerations relating to the subject as follows:
The clearance spaces at each end of a steam cylinder include the clearance proper, as well as the passages and other spaces between the valve and the piston at the end of its stroke. These must evidently be filled at every stroke with steam at the maximum pressure admitted. This may be done in two ways, viz., by admission of steam directly from the boiler or by closing the exhaust passage before the end of the stroke, so that the back pressure vapor will be compressed and the clearance spaces filled with cushioned steam equal, as nearly as practicable, to the initial steam pressure in cylinder. In the first case the cost is the quantity of steam taken from the boiler to fill the clearance spaces, and in the second the quantity of steam required in that particular engine to do the work of compression, supposing the net power furnished to be the same in each case. Generally, the second plan will have the advantage, for the reason that the steam required to furnish the additional power will be worked expansively. There can be no economy of steam by cushioning when there is no expansion, and the full theoretical economy due to cushioning is not attained unless the steam is expanded down to the back pressure where the compression begins, which is undesirable on account of the losses due to interior cylinder condensation during extreme expansion. Hence, in practice it rarely occurs that the energy absorbed in cushioning is entirely utilized during the return stroke. Again, cushioning is an indirect operation, so the economy resulting therefrom should be charged with a portion of the friction of the engine, since the total load is increased for the same net load. Cushioning also increases the average back pressure, which, under certain circumstances, may be a disadvantage. Moreover, in balancing advantages it should be borne in mind that, if there be no cushion, the steam in clearances taken directly from boiler would do some work in an expansive engine. All these and other conditions must be fully considered to ascertain accurately the economy of cushioning, and until some one takes the time to formulate them, the common-sense view must prevail that cushioning is, in general, productive of a small economy of steam; that at least it causes no loss within the limits available with ordinary valve gear, and therefore may be used to any practical extent to produce desired mechanical effects. In practice the question of economy becomes of secondary importance compared with the mechanical advantages, particularly for high-speed engines.

A series of trials of hand firing, as against machine firing, has been conducted in the course of the year, under the auspices of the Manchester Steam Users' Association, and have confirmed what has hitherto been the association's experience, viz., that machine firing was not more economical than careful hand firing.

A dispatch from England states that a portion of the "lattice work" of the Tay Bridge has been recovered, and that "it bears marks tending to sustain the theory of Sir Thomas Bouch, that the train went off the track before the bridge fell."

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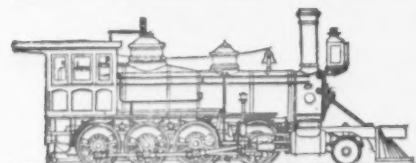
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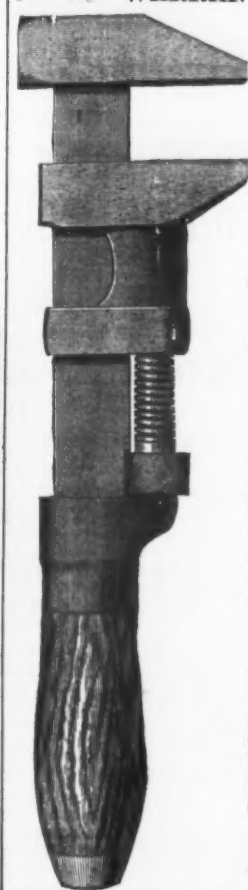
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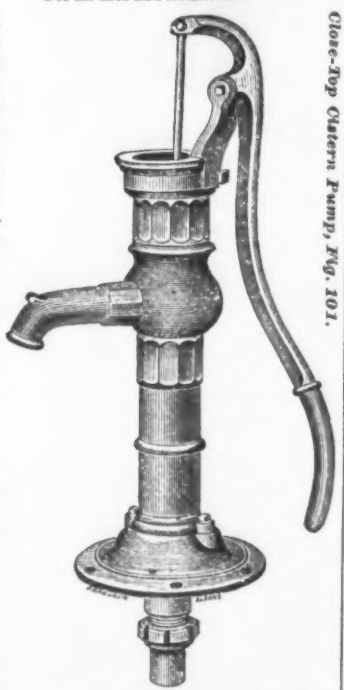
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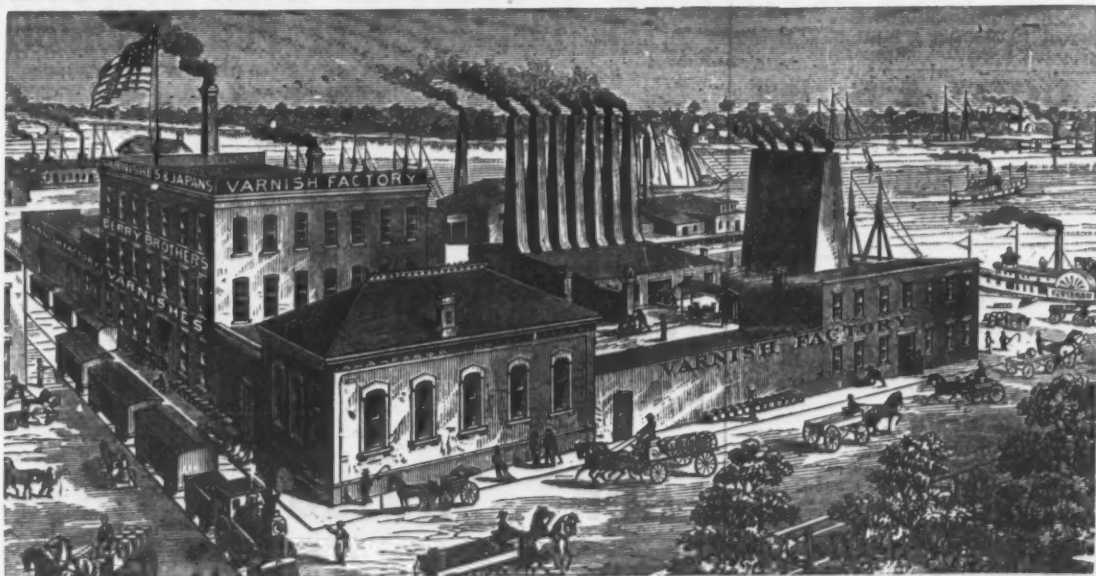
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Improvement in Sheet Iron Shutters.

In competition with the many ingenious devices in the way of sheet-iron shutters, the old style of shutter, consisting of a simple frame of bar iron, covered with plain or slightly corrugated sheet iron, still remains popular, and is likely to be used until something very much better, and, at the same time, quite as simple and cheap, is devised. Fig. 1 of the accompanying engravings shows this style of shutter in all its essential features. The manner of attaching the iron to the frame, and also of attaching hinges, is so clearly represented that no detailed explanation is necessary. While under certain circumstances such shutters are not likely to resist fire as well as some of those in which an air space between the inner and outer surfaces is provided, there

necessary to close it. This turn buckle should be properly located and built in the wall during the progress of the building, the same as the shutter eye.

So far in our description we have referred both to the shutter and trimmings for shutters in a general way. In Fig. 1 is shown an important improvement which has been added recently to shutters of this kind, and which may be applied to shutters of almost any description, to which we desire to call particular attention. In the upper part of each fold is placed a small cast-iron double ring, containing a piece of ground glass, say 3 inches in diameter. The presence of this glass form a porthole which lets in a sufficient quantity of light to guide a person to the window for the purpose of opening the shutter, or in safely moving about the room while the shutters are still closed.

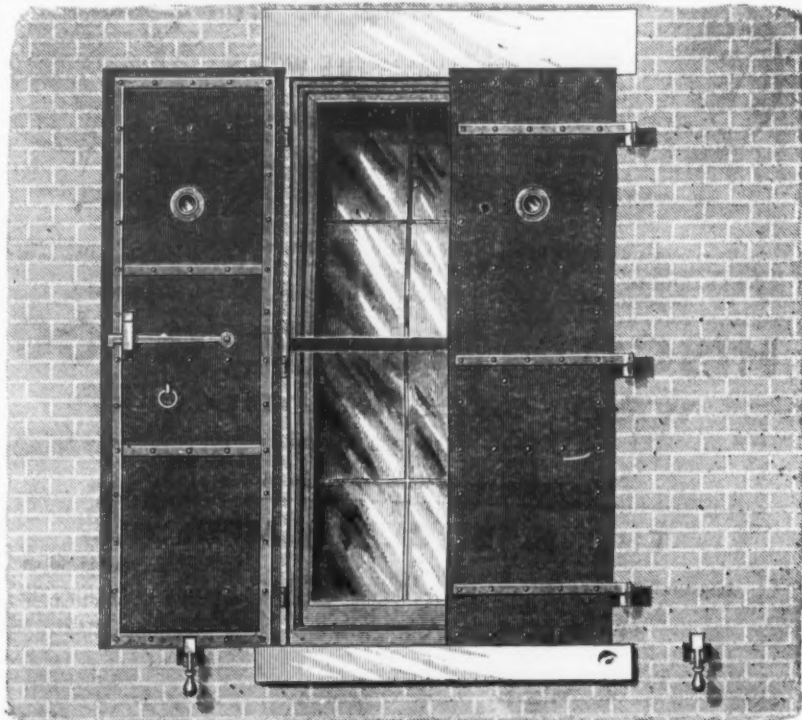


Fig. 1.—General View of Shutters, showing Features of Construction and the Application of Glass Port Holes.

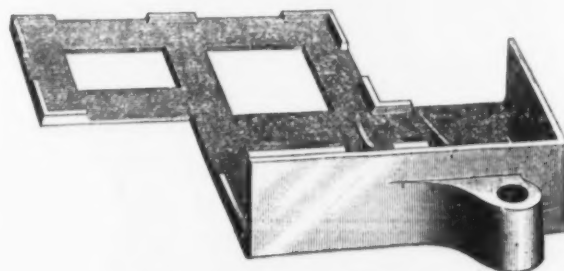


Fig. 2.—Shutter Eye for Walling in.



Fig. 3.—Turn-Buckle for Fastening Iron Shutters.

SHEET IRON SHUTTERS.

is still a justifiable feeling of security in the mind of anyone owning a store or warehouse which is provided with them. Insurance companies discriminate in their rates in favor of buildings furnished with iron shutters of almost any construction.

One of the most important considerations in applying shutters to a building for the purpose of protecting it from fire is the method of attaching them to the walls. Outside of the large cities, in which the subject has received special attention, expedients are sometimes resorted to which are entirely inadequate. We believe there is no device entirely satisfactory save those which are provided at the time of the construction of the building. Bolting through or digging out bricks to insert shutter eyes, which we have sometimes seen done in some of the smaller towns, is a construction not to be recommended. It is safe to say that in all cases provision for attaching the shutters ought to be made as the walls are carried up. By building in the eyes in which the shutters are to hang, solid construction is provided and an accuracy of fit obtained which is very necessary.

Fig. 2 of the accompanying illustration shows a very desirable, and, at the same time, quite common form of shutter eye, in which great care has been taken to provide for all the strains likely to come upon it, and at the same time to give it a shape not likely to be easily pulled from the walls. With it is light, there being no surplus metal employed in any part of it. Fig. 3 shows what is known as a turnbuckle, and which in its general features resembles the eye just described. The pivot catch, which is counterbalanced by the weighted handle, holds the shutter in position whenever it is thrown back, and the arrangement of parts and construction is such that the shutter is easily disengaged whenever it is

Since the glass may be easily removed by a stroke of a hammer or other instrument, these portholes afford firemen an opportunity for inverting the nozzle of their hose in case of fire within. By this means the disastrous effects sometimes attending the opening of shutters while a building is on fire, and the delay which is almost unavoidable under such circumstances is entirely avoided, while the firemen themselves are protected from the flames during the time they are pouring water into the building. The porthole also serves to indicate the presence of fire in the building to those outside of it, a provision not contemplated in the ordinary construction of iron shutters. The improvement has been recently patented, and is now being put on the market by the Aetna Iron Company, of this city. We believe it is of a character to be appreciated by all who use shutters, and since it is very simple, easily applied and comparatively cheap, we think it is likely to come into quite general use.

Another Canal Project.—M. Lepinay, to whom the task of investigating the question of a canal connecting the Bay of Biscay directly with the Mediterranean was committed, has drawn up his report. The canal M. Lepinay proposes starts from Bordeaux and would emerge, after traversing 252 miles, at the ancient port of Narbonne. The number of locks would be 62, their length being 492 feet, so as to allow the passage of ships 439 feet long. The depth is 27.9 feet, and the breadth, where the canal is of single width, is 184 feet at the surface of the water, and 262 feet where it is double, the aggregate length of the latter amounting to 112 miles, or 45 per cent. of the whole length. M. Lepinay estimates that, with the aid of engines of 600 to 1000 horse-power, an average speed of

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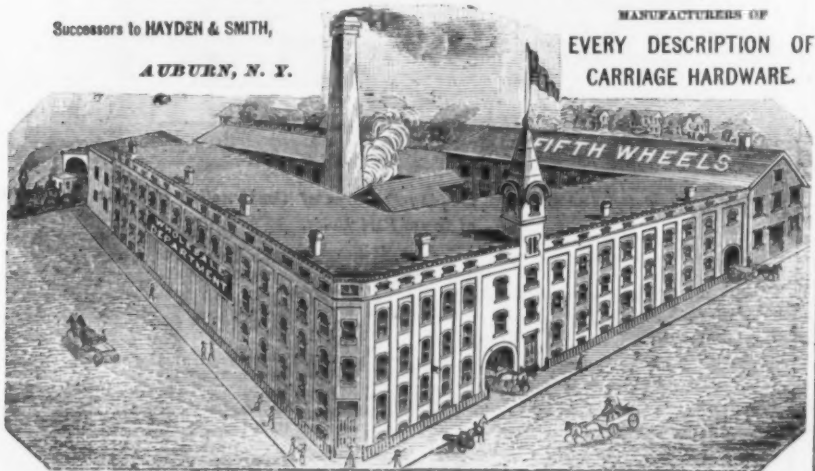
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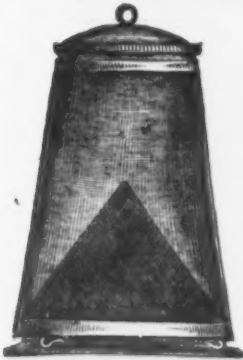
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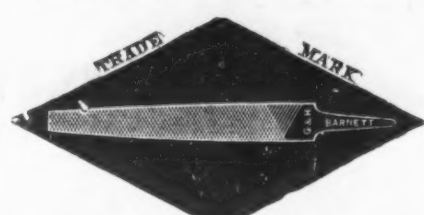
H. HOWSON, Solicitor of Patents. C. HOWSON, Attorney at Law.

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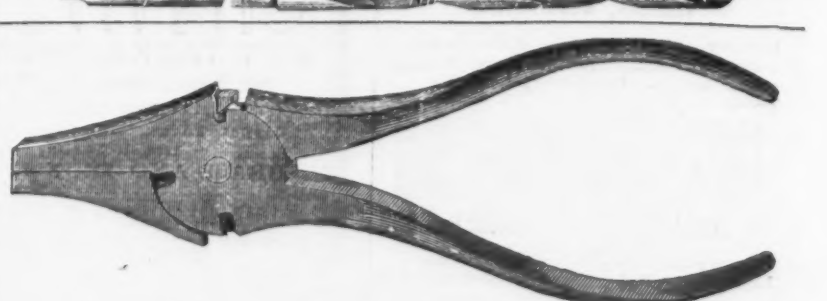
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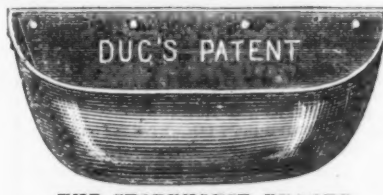
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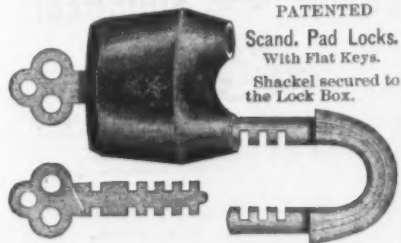
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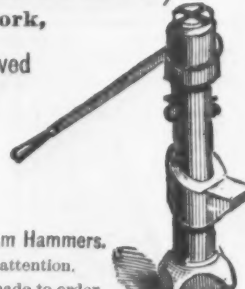
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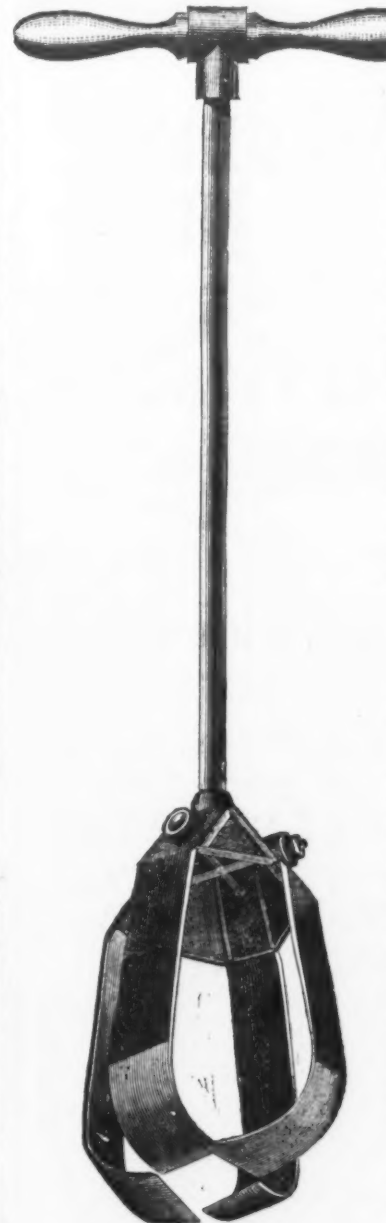
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9.3 miles an hour might be attained; and in this way the journey from Bordeaux to Narbonne might be made in about 48 hours, a loss of four hours on an average, in waiting for the departure included. From sea to sea the journey would take 54 hours, thus making the voyage from Malta to Brest a matter of four days' gain for steamers going 8 miles an hour, and of nearly 30 hours for the large packets making 16. The estimated cost is 550,000,000 francs. The saving to navigation, were this enterprise carried out in the manner M. Lepinay proposes, would be a distance of 800,000, and 1180 miles from sea to sea; from Bordeaux to Marseilles it would be no less than 1597 miles.

"Eclipse" Post Auger.

The Pittsburgh Hinge Company, Limited, of Beaver Falls, Pa., is now turning out a very meritorious article in the line of post augers. It is called the "Eclipse" auger, and contains several valuable improvements.



"ECLIPSE" POST AUGER.

The auger consists of two cutters and two lifters of solid steel, a malleable-iron tapered head, gas-pipe standard, malleable-iron T and a hard-wood handle. The manufacturers claim that it is the only machine adjustable so as to bore different sizes of holes, the cut being regulated by the spaces left between the ends of the cutters and lifters. These are adjusted by means of bolts, and the size of the hole is enlarged or diminished at pleasure. The machine—which is represented in the accompanying cut—is operated by simply placing it upon the ground and turning the handle as an ordinary auger. No bearing down is required, as the machine feeds itself. When full, it is withdrawn from the hole, and a slight stroke upon the ground removes the earth, when the operation is repeated until a sufficient depth is reached. The auger admits of a depth of 3 1/2 feet being reached. The cut of the auger may also be regulated for hard or soft ground.

Making Riveted Sheet and Plate Iron Pipes by Machinery.

Machinery for the production of finished tubes or pipes made of sheet or plate iron is now in successful operation. The sheets or plates are first cut or rolled into strips of suitable width, a machine then rivets or welds them together, forming a continuous length; thus prepared, they are fed into another machine, which forms, punches and rivets them, delivering a finished tube in one piece, the length of which may be extended indefinitely and sawed off as required. In pipe or tubes made by this process the seam takes a spiral form—uniform interior diameter, being secured by an offset on the outside edge of the strip equal to the thickness of the sheet or plate used. Seams thus constructed are superior in strength to the body of the iron, and add greatly to the transverse strength of the sheet, for which reason a tube made of 3/4-inch iron, with a spiral seam, would resist as great a bursting strain as one made of scant 1/2-inch iron with a straight seam, thus effecting a saving of over one-third in the material employed. Recognized engineering authorities give the strength of a longitudinally riveted seam to be only about 55 per cent. of the strength of the iron of which it is made.

Recent tests of spiral seam pipe, made up of galvanized sheet iron and regalvanized after formation, gave, upon a Belfield

gauge, the following extraordinary bursting pressures:

12-inch pipe of No. 16 gauge iron 450 lbs. per sq.	
6 "	18 "
4 "	20 "
3 "	20 "

As yet no heavier iron than No. 12 wire gauge has been used, but experiments have proved the applicability of this system of manufacture to the construction of pipes for hydraulic engineering, boiler shells and flues, and other cylindrical structures for purposes demanding heavy pressures, provision is being made for extending the production in that direction, the chief advantages being the saving of expense over hand labor, the better quality of work produced and the economy in material. The lighter kinds of the spiral pipe are attaining a very general use for leaders, ventilating shafts, blown and suction fan connections, furnace pipe, smoke stacks and a great variety of uses in connection with house construction. The Abendroth and Root Manufacturing Company, 28 Cliff street, New York, are the exclusive manufacturers under the Root patent.

Plating with a Nickel Alloy.—Zucker & Levett, 540-544 West Sixteenth street, New York, have taken the sole agency for the United States and Canada of the Frishmuth & Van Tronk method of plating, with what is said to be an alloy of nickel and aluminium, from a solution consisting of one of the salts of nickel with chloride of aluminium and chloride of sodium. The plating solution made under this patent is sold to consumers, and no royalty is demanded for the use of the process. We have seen several samples of the deposit by this process, of varying excellence, but the same may be said of plating by any process—the results, in any case, depending largely upon the preparation of the work and the skill of the plater. After careful tests, Messrs. Zucker & Levett are prepared to guarantee as good results in the way of color, adhesion, &c., as can be obtained by any known process. The patent has not, we believe, been tested in the courts, but the inventors and agents are confident that it is not an infringement of any claim of the Adams patent, and that it will never be necessary to defend it, though they should be glad to do so if opportunity were offered.

Manufacture of Sheet Lead in China.

The making of sheet lead for the lining of tea chests, &c., is a somewhat important industry of Hong Kong. It is made principally in sundry establishments to the westward. On entering one, workmen will be seen with shears busily employed in cutting out the sheets of lead into the required sizes and shapes. The shears are simply a large pair of scissors, firmly fixed to a solid block of wood some 2 feet in height. The lower blade of the shears terminates in a square piece of iron, instead of being pointed, as is the upper blade. The sheets of lead will also be observed to be of small size and somewhat irregular in shape, and this arises from the method of manufacture, as will subsequently be seen. Going further into the shop will be seen an iron pan raised 12 inches or so above the ground and carefully finished off. Beneath this iron pan is a furnace, and at the side of the pan next the wall is the flue communicating with it. In this pan the lead is melted, and when judged to be hot enough, the workman takes two of the large square paving tiles, which may be seen almost anywhere in the colony, and these are then smoothly and carefully covered with several layers of un-sized paper. Having placed these two tiles before him, one above the other, the workman raises the upper tile with his left hand, and, taking a ladle of the proper size in his right, he dips it in the melted lead and then pours its contents on to the lower tile. He then drops the upper tile and quickly presses the lead out into the form of a sheet. The paper being a bad conductor of heat, the lead does not solidify immediately it leaves the ladle, and, as by long practice the workman always ladles out exactly the same quantity of lead, the sheets made vary but little either in size or thickness.

Improvement in Railway Apparatus.

At the convention of car builders held in Buffalo recently, there was exhibited a new device that may be found to be an important improvement in railway apparatus. It consists of a draw-bar with a self-coupler and an automatic brake combined. The draft is from a system of steel wire cables passing over six pulleys connecting with two coil springs, thereby avoiding the usual rigid movement of the cars in starting and stopping, and, consequently, preventing the destruction of cars and their connections by the jerking of the engine and the concussion at sudden stoppages. The coupling is a solid bar of iron or steel, with a flange at either end that enters the socket as the cars come together without manual assistance, while a lever that is reached without going between the cars is used to uncouple them. This is claimed to be a great feature in the mechanism, and, if adopted, it is believed it will save hundreds of lives every year, besides a large expenditure for links and pins that are now being constantly destroyed. The regulation of the brake is so adjusted that as soon as the tension is slackened the brake is applied to every wheel of the car, so that the engineer always has instant control of his train. He can apply the brakes to every truck in a train of 40 cars instantaneously, without the assistance of a single brakeman. An engineer invented the contrivance. If the device shall be accepted by railroad men, it will be no ordinary compliment to the inventor, as well as a fortune to him. Of the 2000 patent car-couplers, none have as yet been able to supplement the old link and pin system so far as freight cars are concerned. The self-coupling feature of the device, important as it is, is but a small part of the advantages claimed. The flexible connection secured by the springs and cables would seem to be a great improvement upon the rigid draw-bar. Then the automatic brake, if practical, will prove invaluable, not only in the protection of a train from apprehended danger, but in the saving of the service of brakemen.

Cutlery.

FRIEDMANN & LAUTERJUNG,

Manufacturers of
PEN AND POCKET CUTLERY,
Solid Steel Scissors, Shears, Razors, &c.
Sole proprietors of the renowned full concave
"ELECTRIC RAZORS,"
And the celebrated
"ELECTRIC SHEARS." Nickel Plated
Hows.
Agents for the BENGAL RAZORS.
AMERICAN TABLE CUTLERY, BUTCHER KNIVES, &c.
91 Chambers and 73 Reade Sts., N. Y. 423 N. Fifth St., ST. LOUIS, MO.
MERIDEN CUTLERY COMPANY.

THE "PATENT IVORY" HANDLE TABLE KNIFE.

It is the oldest manufacturer of Table Cutlery in America. Exclusive makers of the CELLULOID HANDLE for Table Cutlery. A most beautiful and perfect substitute for Ivory. Also makers of all kinds of TABLE, BUTCHER AND HUNTING KNIVES. Illustrated catalogues with prices sent to the trade on application. SALESROOM, No. 49 Chambers St., N. Y. Address all communications to West Meriden, Conn.

THE
LAMSON & GOODNOW
88 CHAMBERS ST.
MFG. CO. N.Y.
AMERICAN TABLE CUTLERY & C.

AARON BURKINSHAW,

Manufacturer of Pen and Pocket Cutlery, Pepperell, Mass. Established 1853.
My Blades are forged by hand from the best Cast Steel, and warranted. To me was awarded the Gold Medal of the Conn. State Agricultural Society.

The Celebrated VICTOR Cast Shear
SOLD HARDWARE & NOTION DEALERS EVERYWHERE. Special Attention given to orders for export.
Manufactured only by
THE RENZ HARDWARE CO.,
BRIDGEPORT, CONN. U.S.A.
Fine Gray Iron Castings.
Fine Plain and Ornamental Metal Patterns made to order at our new foundry, Knowlton St., E. D. Address
THE RENZ HARDWARE CO.,
Bridgeport, Conn.

JOHN WILSON'S CELEBRATED
TRADE MARK.
"FOUR PEPPERCORNS AND A DIAMOND"
GRANTED A D 1766 BY THE
CORPORATION OF CUTLERS OF SHEFFIELD
AND PROTECTED BY ACT OF PARLIAMENT
REGISTERED ALSO AT
WASHINGTON U.S.A. ACCORDING TO ACT OF
CONGRESS
ALSO AT LEIPZIG, IN
ACCORDANCE WITH THE GERMAN TRADE
MARKS' REGISTRATION ACT.
WORKS: SYCAMORE ST., SHEFFIELD, ENGLAND. Established 1750

HUNTER'S Rotary SIFTERS.
Mixer, Scoop, Measure, Weigher, Egg Beater, Rice Washer, Tomato, Pumpkin, Starch, Wine and Fruit Strainer.
The greatest combination known, and pronounced by press and public the only first-class sifter in the world. Made better, of better stock, sifts much faster, and saves more material than all other sifters. Made in two sizes: No. 1, 3 pts; No. 2, 5 pts. Liberal discount to the trade. Please mention this paper, and send for Illustrated Price List.
J. M. HUNTER & CO., Sole Manufacturers and Owners,
38 W. Fourth St., Cincinnati, Ohio.

BUCK BROTHERS, Millbury, Mass.
The most complete assortment in the U. S. of
Shank, Socket Firmer and Socket Framing Chisels,
PLANE IRONS.
Gauges of all lengths and circles beveled inside and outside. Nail Sets, Scratch and Belt Awn, cisel Handles. A full stock of Carving Tools. Also, small boxes of Tools of best quality.

Wood Workers' Clamps,
To open 2, 2½, 3, 4, 5, 6, 7, 8 and 10 inches.
Strongest and Best Clamp Made.
Malleable Ox Shoes
with
Steel Converted Toe Calk.
Five sizes.
CARRIAGE HARDWARE,
IVES, WOODRUFF & CO., Manufacturers,
(Send for Catalogue.) MT. CARMEL, CONN.

G. W. Bradley's Edge Tools.

Butchers' Cleavers,
Butchers' Choppers,
Axes and Hatchets,
Grub Hoes and Mattocks,
Mill Picks,
Box Chisels and Scrapers,
Ring Bush Hooks,
Ax Eye Bush Hooks,
Socket Bush Hooks,
Watt's Ship Carpenters' Tools,
Carpenters' Drawing Knives,
Coopers' and Turpentine Tools.

MARTIN BOSCHER, Agent, 85 Chambers Street, N. Y.

Cutlery.

ALFRED H. HILDICK,
12 Warren St., N. Y.,
Importer of CHAINS, ANVILS, VISES, &c.
Agency of
HILL BROTHERS & CO., WALSHALL, ENGLAND
GENERAL HARDWARE MERCHANTS,
And of
BALL'S PAT. SOLID STEEL SHEEP SHEARS.
These shears are unsurpassed for cheapness, durability and utility. They are made of one solid piece of steel from point to point, and cannot be broken in use either in the bow or at the junction of the shank and blade. Samples can be seen at above address, or sample lots furnished.

CORPORATE MARK,
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Joseph Rodgers & Sons'
(LIMITED)

CELEBRATED CUTLERY,
No. 82 Chambers Street, New York.
F. & W. CLATWORTHY, Agents.

The demand for Joseph Rodgers & Sons' productions having considerably increased, they have, in order to meet it, greatly extended their Manufacturing Premises and Steam power. To distinguish Articles of Joseph Rodgers & Sons' Manufacture, please to see that they bear their Corporate Mark.

P. O. Box 366.
ESTABLISHED 1836.

Alfred Field & Co.,
COMMISSION MERCHANTS,
New York, Birmingham, Sheffield, Liverpool.

Guns and Pocket Cutlery,
SPECIALTIES.

Headquarters for
ELEY'S BROS.' GOODS, WRIGHT'S ANVILS,
WILSON'S BUTCHER KNIVES, &c.
WOSTENHOLM'S POCKET CUTLERY AND RAZORS.
BUTCHER'S FILES, TOOLS AND RAZORS.
STUBS' FILES, WESTERN FILES,
GREAVES' SHEEP SHEARS,
CHESTERMAN'S TAPES,
GERMAN COIL AND HALTERS and other CHAINS.
BRADSHAW'S TROWELS AND HOES,
CANASTOTA KNIFE CO.'S POCKET KNIVES.
Etc., Etc., Etc.

All sorts of Hardware and Merchandise for import and export purchased on commission.

ROBERT SORBY & SONS,
SHEFFIELD,

MANUFACTURERS OF THE CELEBRATED
Kangaroo Sheep Shears.

The best
Shears
made.
CORPORATE MARK
Every
Shears
Guaranteed.

ALFRED FIELD & CO.,
93 Chambers St., - NEW YORK,
SOLE AGENTS.
Send for price list and terms.

PHOENIX CASTOR CO.,
INDIANAPOLIS, IND.

Send for Illustrated Catalogue.

Shipped as nuts and bolts, at very low rate of freight.
Painted
Vermillion
Red.
Tucker's Incomparable
ADJUSTABLE
STOVE TRUCK.
Packed
One Dozen
In a box.
Patented,
Feb. 13, 1872.
Oct. 1, 1878.
July 1, 1879.
Eight thousand sold the first year.
TUCKER & DORSEY, Mfrs.,
Indianapolis, Ind.

LIGHTNING
STUMP PULLER,
M. E. Bunker & Co.,
Manufacturers,
Indianapolis, Ind.
Observe what absolute power—pulling up on one chain and down on the other.
Pulls 1½ inch on short bit.
Full range length—5 ft. at pleasure.
A stump gives a 10 ft. line adding speed as desired.
Send for Illustrated Circulars and Prices.
We make till either for Cash or Scrip.

Can be applied to any implement, either with or without tongue.
NO. 2
M. E. Bunker & Co.,
Indianapolis, Ind.
Makers.
A perfect Double Tree
A perfect Equalizer
A perfect Stretcher.
Send for Price and Illustrated Circular.
The best selling implement in America. Make its acquaintance by sample order in time for spring trade.

Cutlery.

McCOY & CO.,

IMPORTERS OF

Hardware, Cutlery, &c.

SOLE AGENTS FOR

THEILE & QUACK'S

CELEBRATED

Pocket Knives and
Scissors.

A large stock of

Muzzle & Breech Loading

English Guns.

132 DUANE ST.,
NEW YORK.

Silver Medal, 1878—Paris.



J. R. SPENCER & SON,
Albion Steel Works, Sheffield,
MANUFACTURERS OF

FILES
AND
STEEL,
Table Knives, Razors, Shovels, &c., &c.,
of every description.

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SPENCER
SHEFFIELD
Granted 1749.

SCHRODER LOCK CO.,
Manufacturers of
BUILDERS' HARDWARE,
Locks, Latches,
HINGES,
AND
BRONZE & BRASS GOODS
Of all kinds.
JAIL LOCKS.
Office and Works,
16 & 18 East 7th Street,
CINCINNATI, OHIO.
A liberal discount to the trade.

Established in 1839.

A. G. COES & CO.

WORCESTER,

MASS.,

Successors to

L. & A. G. Coes,

Manufacturers of

THE GENUINE

COES

Screw

Wrenches.

PATENTED,

May 9, 1871.

December 20, 1871.

December 28, 1875.

August 1, 1876.

The backstrain when the wrench is borne by the bar—not by the handle.

The strongest Wrench made, and the only successful Re-enforced Bar.

None genuine unless stamped

A. G. COES & CO.,

Our Agents, GRAHAM & HAINES, 113 Chambers St., New York, carry a full line of our goods, and will be pleased to serve you at factory prices.

CLOTHES WRINGERS.

Self-Adjusting
Steel Elliptic Springs.

"EUREKA"
WRINGER.
BOSTON.

T. J. ALEXANDER, Manager,
BOSTON, MASS.

Romer & Co.

Established 1837.

Manufacturers of Patent Scandinavian or Jail Locks, Brass Pad Locks for Railroads and Switches, Also Patent Stationary R. R. Car Door Locks. Patent Piano and Sewing Machine Locks. 141 to 143 Railroad Avenue, NEWARK, N. J. Illustrated Catalogue sent to the trade on application.

Lemon Squeezer

Far exceeds any that has ever been made; occupying but little space; useful and ornamental. A box of Lemons can be squeezed in Twenty Minutes, breaking all the juice of the lemon and extracting all the juice. There has never been a Lemon Squeezer made that can do what this one can.

ROBERT UNDERDONK, Sole Manufacturer,
405 Grand St., New York.

JAMES COMLY,

4739 Paul St., Frankford, Philadelphia, Pa.,
Manufacturer of

Hardware Novelties, Glass Cutters, &c.

GEO. M. EDDY & CO.,

Manufacturers of

Measuring Tapes

Of Cotton, Linen & Steel.

FOR ALL PURPOSES.

351 to 353 Classon Ave., Brooklyn, N. Y.

CHAS. E. LITTLE,

59 Fulton St., N. Y.

Solid Cast-Steel Pump Augers

For Boring Pump Logs and Pump Tubing, with all necessary fittings. Agency for Barnes' Wood-Working Machinery and Lathes.

49

THE WM. ROGERS MFG. CO., Hartford, Conn., Manufacturers of CUTLERY AND SILVER PLATED TABLE WARE.



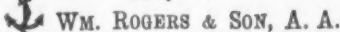
WM. ROGERS,
Senior Member and Manager of ROGERS BROTHERS.
On Knives.



F. WILLSON ROGERS,
Son of the late Wm. Rogers.
On Hollow Ware.



Our Knives are guaranteed to STRIP 12 dwts. of Silver per Dozen. All goods are put up ONE DOZEN in a BOX. All our Knives are put up in the latest and most attractive style, with guarantee card in every box.



Our Spoons, Forks, etc., are guaranteed to STRIP On Tea Spoons, 48 dwts. per gross. On Dessert Spoons and Forks, . . . 72 dwts. per gross. On Table Spoons and Medium Forks, 96 dwts. per gross.

ALL OTHER GOODS IN PROPORTION. All our Spoons, Forks, etc., are plated upon 18 PER CENT. NICKEL SILVER. The best base known for plating upon.



Sextuple Plate. Our Hollow Ware is plated upon the FIRST WHITE METAL, and is guaranteed to be plated fully 50 Per Cent. More Silver than any other brand of goods in the market.

OUR GOODS ARE PLATED 20 PER CENT. ABOVE STANDARD PLATE.

The above Guarantee Card is circulated with all genuine Rogers goods.



No. 600.—List \$6.50.



No. 1.—List \$6 doz.



No. 2.—List \$6 doz.



No. 3.—List \$7.50 doz.



No. 503 List \$6.25.

HALL, ELTON & CO.,

Electro Plated Ware, German Silver and Britannia Spoons.



THE "EASTLAKE." (Patented.)

Factories, Wallingford, Conn.

Salesroom, 75 Chambers Street, New York.



FORKS, SPOONS, Etc.,

Manufactured from Cast Steel, Plated with Nickel and Silver.

WALLACE BROTHERS, Wallingford, Conn.

HOLMES, BOOTH & HAYDENS,

MANUFACTURERS OF

Finest Quality Silver-Plated Spoons, Forks, Knives, &c.

"JAPANESE"
PATENTED.



"JAPANESE"
PATENTED.

NOTICE.—We guarantee the base of our Spoons, Forks, &c., to be full 18 per cent. Nickel Silver, and extra heavily plated with pure Silver. Our goods are all hand burnished, and are first-class in every respect. We pack our Spoons and Forks one dozen in each box.

49 CHAMBERS ST.,
NEW YORK.

Factories,
WATERBURY, CONN.

18 FEDERAL ST.,
BOSTON.

INDUSTRIAL ITEMS.

MASSACHUSETTS.

The newly-organized Boston Wrench Company have elected the following directors: Charles W. Sawyer, of Somerville; Francis H. Raymond, of Somerville; Albert M. Robinson, of Somerville; Henry W. Bragg, of Charlestown; and Charles E. Bowers, of Cambridge. The board elected officers as follows: President, Charles W. Sawyer; secretary and treasurer, Francis H. Raymond.

The Boston and Albany machine . . . at Springfield, have recently added . . . ble power drill for drilling fire boxes, which work has been hitherto done by hand ratchet drills.

The . . . light Company, of Gloucester, have been refitting their offices. The Ames and Gaylord companies have both been making an unusually large number of presentation awards this season. The former company have until January to get ready for their sewing-machine contract, but expect to have arrangements completed before that time.

The directors of the Mt. Washington Glass Company, of New Bedford, have voted to authorize the erection of another furnace as soon as possible, thus doubling the present capacity of the works. They have also increased their facilities for the thorough annealing of all ware manufactured, and are preparing a large line of novelties for the coming season.

The Union Boiler Works, of New Bedford, are having a building erected for them, 64 by 27 feet.

NEW YORK.

D. E. Paris & Co., stove makers, of Troy, are putting up an addition 75 by 61 feet. This will give them a frontage of 312 feet, with a depth of 60 to 120 feet.

Extensive repairs have been made on the Plattsburgh Furnace of Messrs. Naylor & Co.

Prof. Henry Wurtz has removed his laboratory and office from Hoboken to 447 West Twenty-third street, New York city. This is also known as 25 London Terrace.

PENNSYLVANIA.

Mr. John Birkinbine has resigned the management of the Pine Grove Furnace, and will return to the practice of his profession as engineer, giving especial attention to blast-furnace construction and alteration. His office is at 152 South Fourth street, Philadelphia.

The Hollidaysburg Rolling Mill, having completed repairs, started up on the 26th ult., and on the 27th the nail factory started up, but has since shut down.

Work has been resumed, after several years of idleness, in the iron mines near Green, Bart Township, Lancaster County. Operations at the Ferndale Rolling Mill were suspended last week, on account of scarcity of orders, for the first time in many months.

It is stated that the Shenango Furnaces, at Middlesex, have been leased by the Emmett Mining Company, who will take possession at once. One stack is now in blast, and the other will be got ready as soon as practicable.

The Franklin Iron Works, at Port Carbon, have been working double turn for four months, and have orders enough on hand to occupy them for three months to come.

The remaining two of the four new puddling furnaces of the Birdsboro' Iron Works will be ready for operation in a short time.

The Wampum Furnaces were expected to blow in on the 3d or 4th.

The Rochester Tumbler Works shipped 200 cases to China last week. Union Forge, in Lebanon County, is in full operation, making from 30 to 40 tons of iron daily. The managers intend to put up a steam hammer for the purpose of making car axles.

The quantity of coal and coke carried over the Pennsylvania Railroad for the second week of April was 154,228 tons, of which 107,978 tons were coal and 46,250 tons coke. The total tonnage for the year thus far has been 2,027,098 tons, of which 1,424,203 tons were coal and 512,895 tons coke.

Iron ore has been discovered in Center County, near Center Hall, and in West Vincent Township, Chester County.

A telegram from New Castle, dated April 27, says: The Lawrence Iron Works and the Etna Iron Works are now shut down. The two Etna Furnaces, the Clara, Rosena, Neshannock, Sophia and Pot—all the furnaces in this city—are raked down to await the arrival of another iron boom. The only rolling mill going at present is the sheet mill of Bradley, Reis & Co.

PITTSBURGH AND VICINITY.

Livingston & Co., of Allegheny, are enlarging their Novelty Works (to double their present capacity) to meet the demands of their trade. They have been working wholly on orders for the past year, and are now considerably behind. They will soon begin the manufacture of the late Keystone Hardware Company's goods, having secured their patterns. They are now making a general line of domestic hardware and light cast goods of various descriptions.

At the Superior Mill, Allegheny, it has hitherto been the custom to cut the Austrian blooms in two, and roll a 30-foot rail. This has been changed, and they are now rolling out blooms into 60-foot rails, subsequently cutting the rails, this proving the easier and better plan. The rails thus rolled are 30-pound rails, and it is something unusual to roll so light a rail in two lengths.

The 20-inch mill at the Union Iron Works has shut down, owing to a scarcity of orders. The 12-inch mill is off for repairs. At the Black Diamond Steel Works, Park, Bro. & Co. have just put their new open-hearth furnace into operation. It was begun in June last, and has a capacity of seven to eight tons per melt.

Both stacks of the Eliza Furnaces of Laughlin & Co. have blown out, on account of the condition of the iron market. The Soho Furnace of Moorhead, McCleane & Co. has also gone out, and one of the Shoenberger stacks has blown out. These furnaces will blow in again just as soon as trade demands it.

VIRGINIA.

The Low Moor Iron Company, of Virginia, are building the largest blast furnace in the State at Low Moor. The buildings are nearly all up; the brick masons have the stack and stones lined nearly to the top, and it is hoped to put her in blast in about two months.

The Longdale Iron Company have their ore mines in full operation, employing a large number of men and taking out quite a large amount of ore daily. Their blast furnace at Longdale has been doing well for some time. They now are engaged building a new furnace at that place, somewhat larger than the old one, on which work is being pushed as speedily as possible.

The ore mines of the Pennsylvania and Virginia Iron and Coal Company, at Ferrol, are being worked steadily, and a large amount of ore is shipped daily. The ore is shipped to their furnace at Quinnemount, W. Va. The company is now employing about 150 men in their ore mines, which are under the general management of Mr. Daniel A. Fulton.

OHIO.

H. B. Wick died in Youngstown on Friday evening. He was a member of a very numerous family, who have been largely instrumental in the development of the Mahoning Valley. He and his brothers Henry, Caleb B. and Paul, started the rolling mill in 1846, which has since developed into the huge establishment of Brown, Bonnell & Co. At the time of his death he was largely interested in various banking, coal, mill and railroad enterprises. He leaves a large fortune.

The Steubenville Furnace has stopped operations with a large amount of stock on hand.

The Old Empire Mills, at Cincinnati, have been purchased by the Cincinnati Rolling Mill Company, who have added two new scrap furnaces, and are running the mills on wrought scrap. They are turning out a fine quality of bar, hoop and band iron.

The Etna Furnace, at Ironton, was to have started up on the 3d on cold-blast charcoal iron.

The foundation of the Union Glass Works, at Bellaire, is about completed. Several of the smaller buildings are already up.

The Forest City Steel Company's works, at Cleveland, have started up with three hammers and a capacity of four tons a day.

The Geneva Tool Company, Geneva, manufacture plows, forks, soybean snaths, hoes and rakes, employing 90 men. They are running 12 hours a day, and have been for months behind orders. This company first began business in 1846, the present organization dating back 10 years.

The Etna Iron Works, of Ironton, have funded their total indebtedness into 6 per cent. interest bearing 10-year bonds, and it is rumored that the stack Blanche will be completed and put in operation ere long.

The Ohio Furnace will start her blast the middle of next month. The Burgess Steel and Iron Works, of Portsmouth, have pushed their repairs and rebuilding far enough to be able to resume operations in a few days.

The seventeenth double puddling furnace is being rapidly completed at the Youngstown Rolling Mill.

The Grafton Furnaces, at Leetonia, have blown out on account of the slackness of the demand for iron.

ILLINOIS.

Ground was broken on the 26th ult. for the buildings of the combined shops of the Pullman Palace Car Company and the Allen Paper Car Wheel Company, in the village of Hyde Park, just south of Chicago. The works, it is said, will cover 160 acres, and are to be completed about October 1st. The machinery is to be run by the great Corliss engine which was exhibited at the Centennial Exposition.

The Northwestern Horse Nail Co., of Chicago, have been running their manufactory overtime since the 16th of last July. The orders from home trade compel them to decline many large orders for export.

The Chicago Spring Co., on North Water street, Chicago, have recently refitted and equipped their manufactory with new and improved machinery. They turn out one and a half tons of manufactured steel springs a day, and are considerably behind their orders.

KENTUCKY.

Pennsylvania Furnace, having completed her repairs, has fired and will put on blast this week.

Ashland Furnace is doing well, making week before last an average of 54 3/4 tons per day.

Mt. Savage expects to be in blast by the 10th of this month.

Iron Hills will not be ready to blow in before the 15th prox.

MICHIGAN.

The Baugh steam forge and rolling mill, Detroit, are kept busy making iron for the Michigan Car Company. The completion of their puddle mill was considerably delayed from various causes, but if no further troubles occur, it will be in operation by the middle of June.

The Eureka Iron Company, Wyandotte, have all their mills on double turn, with orders ahead. They are making 900 tons of large plates for the Wyandotte Iron Ship Company. They expect to have their new puddling process in operation soon.

KANSAS.

The Kansas Rolling Mill Company are now employing 500 men at their works at Rosedale.

MISSOURI.

The Deakin Bessemer Steel and Iron Co. have been organized in St. Louis to introduce what is called the Deakin-Block process for welding Bessemer steel. It is claimed that rail ends, steel cuttings, &c., can be utilized by this process.

The Vulcan Steel Works of St. Louis has resumed operations in all its departments on the basis of prices adopted by the company.

An Iron Sailing Ship Launched.—The three-masted schooner Josephine was launched on the 28th ult. from the shipyard of Wm. Cramp & Sons. She is the first iron sailing vessel built upon the Delaware River.

H. D. SMITH & CO.,

Plantville, Conn.,

Manufacturers of the

BEST QUALITY CARRIAGE MAKERS' HARDWARE.

Manufacture the Largest Variety of Forged Carriage Irons of Best Material and Workmanship.

PRICES LOW FOR QUALITY OF WORK FURNISHED.

SEND FOR PRICE LIST.

SARANAC HORSE NAIL CO.

Polished or Blued Horse Nails, Hammered and Finished.

The Saranac Nails are hammered hot and the finishing and pointing are done cold. Quality is fully guaranteed. For sale by all leading iron and hardware houses.

S. P. BOWEN, President and Treasurer.

J. W. LYNDE, Secretary.

PLATTSBURG, N. Y.

ELY & WILLIAMS, Agents, 1232 Market Street, Philadelphia; 114 John Street, New York; 36 Oliver Street, Boston.

AGENTS FOR

W. & C. Scott & Son's,

J. P. Clabrough & Bros.'

C. G. Bonehill's

BREECH LOADING GUNS.



COLT'S

PARKER'S and

REMINGTON'S

BREECH LOADING GUNS.

HARTLEY & GRAHAM,

Post Office Box 1760.

NEW YORK.

17 and 19 Maiden Lane.

Importers and Jobbers,
AMERICAN BREECH LOADING
ENGLISH " "
BELGIAN " "

GUNS

CHEAPEST AND BEST GRADES.
ENGLISH MUZZLE LOADING
BELGIAN " "
FLOBERT RIFLES, Plain and Remington System.

BRITISH BULL DOG REVOLVERS, 38, 44 and 45 Calibre.

Agents for COLT'S and ROBIN HOOD line of REVOLVERS, BRIDGEPORT GUN IMPLEMENT CO.'S GOODS, UNION METALLIC CARTRIDGE CO.



A. A. WEEKS,
Manufacturer of
Hardware Specialties,
89 John St., New York.



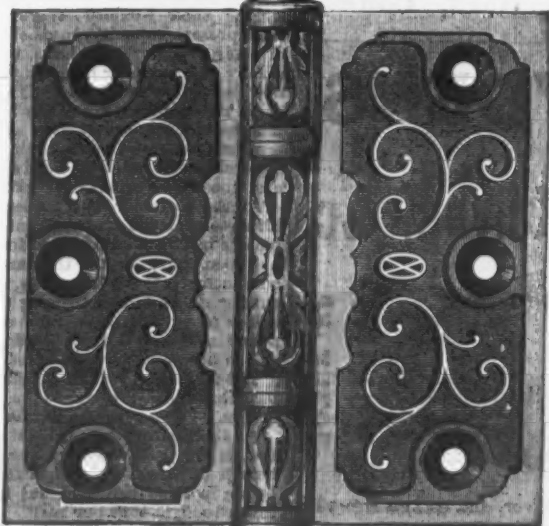
Spofford's Patent Bit Brace.
Manufactured by
FRAY & PIGG,
Bridgeport, Connecticut, U. S. A.
All Iron, Four Sizes. Rosewood Head and Handle.
No. 7... 7-inch sweep. No. 107... 7-inch sweep.
No. 8... 8-inch sweep. No. 108... 8-inch sweep.
No. 10... 10-inch sweep. No. 110... 10-inch sweep.
No. 12... 12-inch sweep. No. 112... 12-inch sweep.
No. 14... 14-inch sweep. No. 114... 14-inch sweep.

THE CLARK MFG. CO.,

Successors to
MANUFAC

CLARK & CO.,
TURNERS OF

SEND FOR CATALOGUE

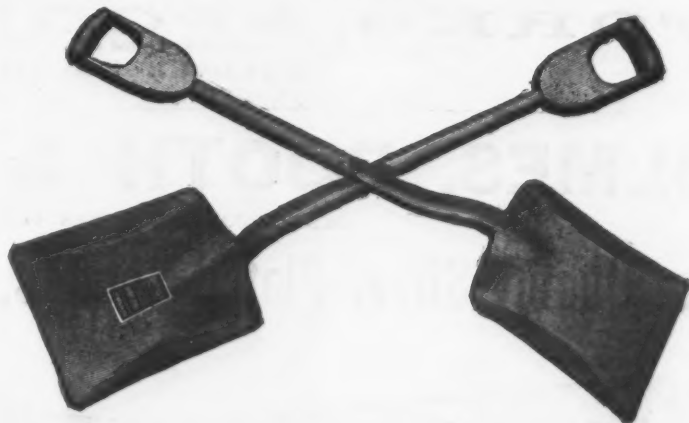


AND PRICE LIST.

BUILDERS' HARDWARE,

BUFFALO, NEW YORK.

HUSSEY, BINNS & CO.,

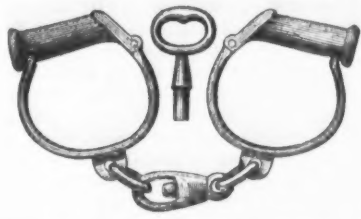


PITTSBURGH.

SHOVELS, SPADES and SCOOPS.

PROVIDENCE TOOL CO.

Providence, New York, Boston, Chicago.



Wrist & Ankle Shackles.

REVERSIBLE

ICE AND FLOOR SCRAPERS,

MADE BY

PROVIDENCE TOOL CO.,

Providence, R. I.

The advantage of this Scraper is that each cutting edge can be changed as fast as worn, and a new and sharp-cutting edge. Thus the Scraper can be used and the whole blade made available. It is especially useful in cleaning ice from sidewalks. Price, \$9 per doz.



HENRY B. NEWHALL,
105 Chambers St.,
New York Agent



N. Y. MALLET and HANDLE WORKS

Manufacturers of
Calkers', Carpenters', Stone Cutters',
Tin, Copper and Boiler Makers'
MALLETS,

Hawking Beetles, Hawking and Calking Irons:
also all kinds of Handles, Sledge, Chisel and Hammer Handles. Also
COTTON AND RALE HOOKS,
Patented Feb. 13, 1877; a new combination of Hooks.
456 E. Houston St., New York City.

THE FAR-FAMED
AMERICAN
LUBRICATOR.
AMERICAN LUBRICATOR CO.
DETROIT, MICH. U.S.A.

Vulcanized Rubber Fabrics

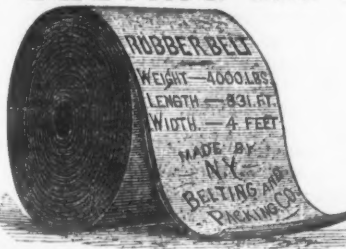
ADAPTED TO
MECHANICAL PURPOSES.

RUBBER BELTING and PACKING.

Machine Belting,
Steam Packing,
Leading Hose,
Suction Hose,
Grain Elevator

Belting,
Steam Hose,
Piston-Rod

Packing,
Gaskets and Rings.



Vacuum Pump

Valves,

Ball Valves,

Car Springs,

Wagon Springs,

Gas Tubing,

Machine Belting,

Wringer Rolls,

Billiard Cushions,

Grain Drill Tubes,

Emery Wheels.

This company manufactured the immense DRIVING and ELEVATOR BELTS for the Buckingham Elevators at Chicago, which have been running perfectly for more than Twelve Years, also those for Armour, Dole & Co., Chicago, and Vanderbilt's great elevators of the New York Central and Hudson R. R., New York, being the Largest Belts in the World. We are now making an Elevator Belt, 36 inches wide and 200 feet in length, which will weigh over 16,000 pounds.

Pat. 644



Plain and Rubber Lined.

Circular Woven-Seamless Antiseptic RUBBER

LINED "CABLE" HOSE and "TEST"

HOSE, Vulcanized Para Rubber and Carbolized Duck,

for the use of Steam and Hand Fire Engines, Force

Pumps, Mills, Factories, Steamers, Ships, Hospitals, &c.

"TEST" HOSE.

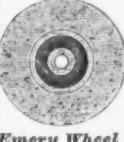
"CABLE" ANTISEPTIC.



Pat. July, 1879.

Emery Wheels and Packing.

Patented.



Emery Wheel

ORIGINAL

Solid Vulcanite
EMERY WHEELS

LARGE WHEELS MADE ON CAST-IRON CENTER IF DESIRED.

The properties of these Wheels are such that they can be used with great advantage and economy for cutting, grinding, and finishing Wrought and Cast Iron, Chilled Iron, Hardened Steel, Slate, Marble, Glass, etc. These Wheels are extensively used by manufacturers of Hardware, Cutlery, Edge Tools, Plows, Safes, Stoves, Fire Arms, Wagon Springs, Axles, Skates, Agricultural Implements, and small Machinery of almost every description.

Pat. Jan. 26, 1869.

PATENT ELASTIC

Pat. Jan. 26, 1869.



Rubber Back Square Packing

BEST IN THE WORLD.

For Packing the Piston Rods and Valve Stems of Steam Engines & Pumps.

It represents that part of the packing which, when in use, is in contact with the Piston rod. A the elastic back, which keeps the part B against the rod with sufficient pressure to be steam tight, and yet creates but little friction.

This Packing is made in lengths of about 20 feet, and of all sizes from 1/4 to 2 inches square.

Pat. 11,228, 213,501.



For Halls, Flooring, Stone and

Iron Stairways, &c.

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Trade-Mark Decisions.

BY FRANCIS FORBES, COUNSELLOR AT LAW.

(Continued.)

§ 9. *Massachusetts*.—Thomson vs. Winchester (10 Pick., 214, 1837). If the defendant made and sold medicines, calling them "Thomsonian medicines," and sold them, or placed them in the hands of others to sell, as and for the medicines made and prepared by the plaintiff, the plaintiff will be entitled to recover damages. If the word "Thomsonian" had acquired a generic meaning, descriptive of a general kind, quality and class of medicines, although the plaintiff was the inventor, he had no exclusive right to compound them, not having a patent, and no exclusive right to the use of the name. It made no difference that the defendant put up an inferior medicine under the name "Thomsonian" if he did not sell it as and for the medicine of the plaintiff.

Marsh vs. Billings (7 Cush., 322, 1851). In this case it was held that plaintiff, a common carrier, with an exclusive license from the "Revere House" to use its name on his coaches, could maintain an action against a rival carrier who also used the words "Revere House," but without authority. Defendant had a right to carry passengers to the Revere House, but not to hold himself out to the public as in the employment or having the patronage or confidence of the Revere House. Damages need not be proved to warrant a verdict for nominal damages. Jury not confined in their verdict to loss caused by actual diversion of traffic, but may infer such injury as warranted by the evidence.

Ames vs. King (2 Gray, 379, 1854). A bill in equity to restrain the fraudulent use of trade marks cannot be maintained under St. of 1852, c. 197, without alleging and proving that such use was for the purpose of falsely representing the articles so marked to be manufactured by the plaintiff.

Bowman vs. Floyd (3 Allen, 76, 1861). This was the case of the continued use of a firm name after the decease of one of the partners whose name appeared in the firm name. Under ch. 56 § 4, General Statutes, the court has power to restrain such use of the name of the deceased partner, unless he had given his written consent to such use during his lifetime, or it had been given by his executors.

Rogers vs. Taintor (97 Mass., 291, 1867). F. J. R. & T., copartners, began business of manufacturing machinery at Worcester, in 1852, under the firm name of F. & Co., and F. J. R. and C., copartners, began like business at Cincinnati in 1853, under the same name, using it as the style of the firm and as a trade-mark. F. died in 1854. Ever since his death F. J. R. & C. continued the business at Cincinnati with all the rights as to the use of the name of F. & Co. which the Cincinnati firm had originally; and J. R. & T., copartners, continued the business at Worcester, under the name of F. & Co., with the assent of F.'s representatives until 1861, when their firm was dissolved and its orders, correspondence and good will were sold to T., who thereafter pursued the business of buying and selling, but not of manufacturing machinery. Held that J. R. & C. could not maintain a bill in equity to enjoin T. from using the name F. & Co. in his business, and attaching it to machinery which he sells, made by others than themselves.

Emerson vs. Badger (101 Mass., 82, 1869). Charles Emerson, a maker of razor straps which bore a label stating that they were made by "Charles Emerson, Emerson Place," taught his business to his five nephews. After his death intestate one of them, of the same name as the uncle, carried on the business at Emerson Place, and used a label precisely similar to that formerly used by his uncle. Held that it was no infringement of this nephew's rights for the son of another nephew to use a label on similar straps which he manufactured, stating that he was the son of a successor of the "original Charles Emerson, Emerson Place."

Hallett vs. Cumston (110 Mass., 29, 1872). Plaintiff allowed his name to be used in the firm name "Hallett & Cumston," without any interest in said firm. On the death of Cumston his son continued to use same firm name in partnership with another person by the name of Hallett. Held, that plaintiff who had no interest in the business of Hallett & Cumston, had no right to any trade-mark used in it. He could not, therefore, maintain suit to restrain the use of the name Hallett & Cumston as a trade-mark.

Morse vs. Hall (109 Mass., 409, 1872). Under statutes forbidding continued use of name of deceased partner the surviving partner cannot use the name of the deceased partner without consent of his legal representatives.

Sohier vs. Johnson (111 Mass., 238, 1872). A trade-mark is a device or symbol used to designate the article manufactured, and the right to use it passes with the business and good will as an incident, unless something appears to show a different intention of the parties.

In Chase vs. Mayo (121 Mass., 343, 1876). It was decided that an official inspector of fish, who branded the packages of fish packed by him in his business with his official brand, does not thereby gain a private right in the brand as a trade-mark.

In Gilman vs. Hunnewell (122 Mass., 139, 1877). Gray, J., said: "A trade-mark may consist of a name or a device or a particular arrangement of words, lines or figures in the form of a label, which has been adopted and used by a person in his business to designate goods of a particular kind manufactured by him, and which no other person has an equal right to use. The right in a trade-mark so applied is recognized as property which a court of equity will protect by injunction. A mere general description, by words in common use, of a kind of article, or of its nature or qualities, cannot of itself be the subject of a trade-mark. A person may have a right in his own name as a trade-mark, as against a person of a different name; but he cannot have such a right as against another person of the same name, unless the defendant uses a form of stamp or label so like that used by the plaintiff as to represent the defendant's goods as of the plaintiff's manufacture. * * * The court will not restrain a defendant from the use of a label on the ground that it infringes the

plaintiff's trade-mark, unless the form of the printed words, the words themselves, and the figures, lines and devices are so similar that any person, with such reasonable care and observation as the public generally are capable of using and may be expected to exercise, would mistake the one for the other." The principles of law thus enunciated were applied to the case, which is too long to be given in this article.

§ 10. *Michigan*.—Gray vs. Koch (2 Mich., N. P., 119, 1871). No property can be acquired in words or marks which do not denote the goods or property or particular place of business of a person. Held, accordingly, that no person, by prior use, can acquire an exclusive right to the use of the words "Mammoth Warehouse," as a sign or designation of a place where a large amount of clothing is kept.

§ 11. *Missouri*.—Filley vs. Fessett (44 Mo., 168, 1869). Plaintiff's stoves were marked with oak leaves and the words "charter oak." Defendants were held to infringe, though they omitted the oak leaves. The imitation need not be exact, nor of the whole trade-mark. It will be enjoined if likely to deceive. It is not necessary to prove actual deception of others. It is no defense that others have infringed, unless it be shown that plaintiff assented to or acquiesced in such infringement.

McCartney vs. Garnhart (45 Mo., 503, 1870). Plaintiff sold whiskey in barrels, on the heads of which were stenciled two anchors, with the upper parts leaning away from each other. Defendant sold whiskey in barrels, on the heads of which were stenciled two picks with the handles leaning toward each other. The names of plaintiff and defendants were used on their own barrels respectively. The only similarity was between the anchors and picks. No fraud was shown, nor that any one had been misled. Held that the resemblance between the two brands is too slight to be likely to mislead.

State of Missouri vs. Gibbs (56 Mo., 133, 1874). "Lea & Perrin's Worcestershire Sauce." The act to protect merchants, &c., against counterfeit trade-marks, approved Feb. 22, 1870, did not abridge the common law property in a trade-mark, and applies to citizens of other States and nations, as well as those of Missouri.

St. Louis Piano Mfg. Co. vs. Merkel (1 Mo., App. 305, 1876). Plaintiffs used the words "bell treble" in circulars and other advertisements of its pianos, but did not affix the words to pianos. Defendants affixed the words to their pianos. Injunction against defendant in court below was dissolved, because "the failure of the plaintiff to affix the term or name 'bell treble' to pianos of its manufacture disables it from claiming that defendants have injured it by affixing it to theirs."

(To be continued.)

LABOR AND WAGES.

The anthracite coal companies agreed to resume operations on Monday, the 3d, but suspension will follow on Thursday, Friday and Saturday, and be repeated on the three days beginning May 13.

The strike among the laborers at Jones & Laughlin's mill, Pittsburgh, against a reduction still continues, and the mill is idle.

The workmen at the Pittsburgh blast furnaces have been notified of a reduction. Some have accepted it, and the furnaces will continue to blow. Others refused it, and the furnaces, as a result, have blown or will blow out.

C. H. Nimson, superintendent of the Allentown Rolling Mill, Allentown, Pa., has issued the following rates of wages for May: "For puddling, \$4 per ton, and all other labor in the Allen puddle mill and Allen rail mill 10 per cent. below March rates. For boiling, \$4.50 per ton. All other labor in the Lehigh mills 12 1/2 per cent. below March rates." The men affected by the reduction are anything but pleased with the order.

Work has been resumed at most of the idle foundries at Pittsburgh, the demand for a reduction having been withdrawn.

The Vulcan Steel Works at St. Louis, Mo., have resumed in all departments on the terms offered by the works.

A miners' convention, representing the railroad and river pits of West Pennsylvania, has been called at Pittsburgh for the 5th inst., to consider the proposed reduction to 3 cents per bushel for mining.

The unsettled condition of affairs at and near Belleville, Ill., and throughout the coal mining districts of St. Clair County, between the miners and mine operators, seems likely to lead to serious disturbances. For a long time past the coal diggers have been receiving 4 cents per bushel for mining, have worked but eight hours per day, and have restricted the output to 50 bushels per day per man. Other restrictions also have been adopted and enforced by the miners, until the operators say the Miners' Union practically control their business. They have become tired of this, and assert that they intend to break it up. With this object in view they have formed a combination, or entered into an agreement to close their mines simultaneously, and to-morrow night will probably see all the coal mines of St. Clair and perhaps Madison County closed, not to be opened again until the miners agree to the operators' terms. What these terms will be cannot now be said, but probably 3 cents for digging and the absolute right to transact their business and control their property in their own way. The miners have assumed a threatening attitude, and an outbreak is apprehended. Governor Cullam, of Illinois, has been advised of the situation, and has sent Sheriff Weber, of St. Clair County, official instructions to use every means in his power to protect property and preserve peace; also to take every precaution possible to prevent any demonstrations likely to lead to violence.

The striking miners at Clinton and Wampum, Pa., have gone to work at 80 cents a ton. They were getting 90 cents before the strike.

The laborers of the Lucy Furnace, Pittsburgh, have accepted a reduction of 10 per cent. in their wages.

An English firm, Messrs. John Reynolds & Sons, of Newtown Bay, are making steel nails.

CHALFANT MFG. CO.,

Office and Warehouse,

435 Arch St., Philadelphia.

Owners and Manufacturers of the

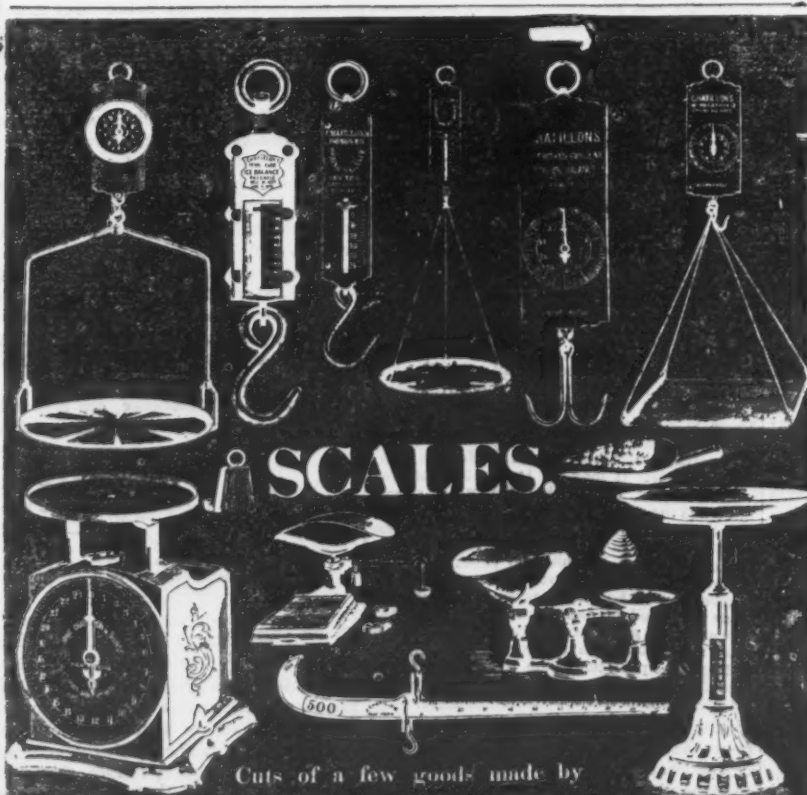
Celebrated Patent Gas Heating Smoothing Iron.

Can be heated on any ordinary gas burner in three minutes. People who have to board cannot get along without them.

Also manufacturers of the

Improved Troy Polishing Iron

for laundry purposes. For sale by Hardware and Housefurnishing dealers.
Liberal discount to the trade.



SCALES.

Cuts of a few goods made by

JOHN CHATILLON & SONS, NEW YORK, U.S.A.

The Iron Age

AND
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New York, Thursday, May 6, 1880.

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JAMES C. EYLES . . . Editor.
JOHN S. KING . . . Business Manager.

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RATES OF ADVERTISING.

On square (12 lines, one inch), one insertion, \$2.50; one month, \$7.50; three months, \$15.00; six months, \$25.00; one year, \$40.00; payable in advance.

WILLIAMS, Publisher,

83 Reade Street, New York.

NEW YORK: 77 Fourth Avenue
OS. D. WEEKS, Manager and Associate Editor.
PHILADELPHIA: 22 South Fourth Street
T. H. HOBBS, Manager.

CINCINNATI: 100 Main Street
T. T. MOORE, Manager.
CHATTANOOGA: 18th and Market Streets
S. B. LOWE, Manager.

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The publishers of *The Iron Age*, 44 Cannon Street, London, England, will receive orders for subscriptions and advertisements on our regular terms.

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Forty-seventh Page.—New York Wholesale Prices (Continued).

Forty-eighth Page.—Philadelphia and Pittsburgh Hardware and Metal Prices.

"tariff so long as the importation of foreign labor is not prohibited, or at least restricted; that the importation of human working power from foreign countries creates a dangerous competition with domestic working power, and is the cause of want, destitution, vice and crime," &c. The delicate sarcasm of this report is in the fact that if those who preach and teach these doctrines had had them applied to themselves, they would not have been in Pittsburgh to teach them. They are worthy of the palmiest days of "Know Nothingism."

Railroad Earnings During the First Quarter of the Year.

The iron trade is at the present time so much engrossed with the serious questions growing out of an excessive supply, that matters affecting the demand are not given that close attention which they would seem to deserve. That current consumption is large, no one is likely to deny, and it is a matter of much interest to inquire how far the prosperity and, consequently, the needs of the customers of iron and steel manufacturers give promise of restoring the equilibrium between supply and demand, and bringing about a steady and fairly remunerative trade. Much interest attaches, therefore, to the condition of one of the greatest consumers of iron and steel in all shapes—the railways, new and old, of this country. With great activity in the extension of our present system, and ample returns in working existing lines of travel and traffic, the requirements of 85,000 miles of railroad must do much toward establishing the iron trade on a better basis. For many years a large part of the carrying roads of this country have been forced, by constant and considerable reductions in the volume of their business and decreasing rates, to restrict operating expenses and outlays for maintenance and repair to narrow limits. It was well known that this enforced economy had in many cases been carried very near the limits of safety. The most urgent and imperative of repairs and improvements have, in all probability, been now effected, and while these no doubt constitute a considerable bulk of the demand accumulated for years, there is a more important class of orders which may be looked forward to at an early date. The very urgency of one part of the demand from consumers like the railways, has checked and held in abeyance what we believe to be really the bulk of the trade. New or projected lines of travel are not, as a rule, abandoned or suspended because rails happen to be dear and the market for materials is rising; but old and established railways will carefully and closely calculate the cost of proposed extensions and improvements.

We have no means of ascertaining with any degree of accuracy to what extent repairs are carried forward, and can still less speak with confidence of the work now in suspension or contemplation, so far as existing lines are concerned. There is, however, one portion of the work in which railways are engaged on which quite complete and recent statistics are available. From a recent issue of the *Railroad Gazette* we learn that up to the close of April no less than 1096 miles of new railroad track were laid, against 391 miles reported at the same time in 1879, 267 miles in 1878 and 269 miles in 1877. These figures reveal a great activity, which is all the more remarkable because much of the mileage added in this period has been undertaken by old established lines, who are more conservative in their management and much more easily deterred from laying additional track by an unfavorable state of the markets for materials, than the projectors of new enterprises are apt to be.

Many prudent railway managers who have, perhaps, set aside certain limited sums for purposes of reconstruction or extension, will conclude to wait for a more favorable opportunity, and continue to use makeshifts which have served them tolerably well for years. Now that prices have receded from their extreme limit, railway officials will again be in a position to consider the advisability of taking into hand many projects of renewal and improvement which they were reluctant to enter upon at an earlier date. For many roads the season of greatest activity has passed, while that most favorable to building, &c., is at hand. How prosperous our railroads have been is clearly shown by the returns of their earnings during the first three months of the present year. Our contemporary, the *Railroad Gazette*, has compiled and published in a tabular form the earnings of a large number of roads (53 in all), controlling an aggregate of 30,861 miles, representing about 35 per cent. of all the lines in operation in the United States. Their receipts were, during the three months ending March 31st, 1880 and 1879, respectively, \$61,766,238 and \$48,464,181, thus showing an increase of \$13,302,057. The increase of mileage was 8.9 per cent., while that of earnings was 27.4 per cent. While in the case of some of the smaller roads the earnings were nearly or even more than doubled, the larger and more important railways were benefited as follows: The earnings of the Central Pacific increased 1.8 per cent., those of the Chicago, Milwaukee and St. Paul, 41.3 per cent.; the Chicago and North Western, 22.5 per cent.; the Grand Trunk, 13.6 per cent.; the New York Central and Hudson River, 15.7 per cent.; the Pennsylvania, 21.1 per cent.; the Philadelphia and Reading, 33.4 per cent.;

the Union Pacific, 32.2 per cent., and the Wabash, St. Louis and Pacific, 35.6 per cent.; the receipts of none of these railways being below \$2,000,000 for the period indicated.

In the light of these figures there can remain no doubt that the business of the railroads has been a very satisfactory one, although it should not be forgotten that it may appear unduly so by comparison with the dull period of a year ago. But even making allowance for this fact and for the circumstance that with the opening of navigation in all parts of the country both volume of business and rates will decline, it is evident that our carrying companies have been and are now making money. Their prospects for the future are promising. The tide of immigration which has set in with such unexpected force during this year will benefit no industry as directly and as immediately as our railways, many of whom will see vast sums flow into their coffers from the sales of their lands, while others will feel the impulse in the shape of increased business. Never before has this country witnessed such an influx of foreign laborers and mechanics as now, the arrivals at the port of New York during the month of April being no less than from 46,000 to 47,000 souls, and as the causes leading to this movement continue to be operative, there is every prospect that the numbers reaching our shores will rather tend to increase than to fall off. It is not unreasonable to suppose, therefore, that a portion of the increased earnings of our railways will be directed to improvements in roadway, bridges, rolling stock, machinery, &c., and this is borne out by the fact that many of the industries dependent largely or exclusively upon the patronage of the railroads, are doing a good business. A perusal of the reports of railway companies will show that much has been done, and we believe that much more will be done as soon as railway officials have gained confidence in a permanence of prices of materials, and are convinced that the reaction has carried prices to their lowest level. It is not too much to say that dilatory action, when prices were low, followed by a wild rush as soon as an upward tendency became apparent, has in the last year seriously injured both consumers and producers. It is to be hoped that both have profited by so severe a lesson, and we feel confident that by following the policy of holding aloof, railway officials will again be likely to do injury to themselves. The struggle between foreign and domestic makers is one unusually favorable to consumers, who should not, however, be led to believe that it can result in reductions approaching those reached in former years, because the conditions are now widely different from those then governing the trade.

The Iron Outlook in England.

Notwithstanding the discouraging nature of our current cable advices from Great Britain, there are some well-informed people who do not hesitate to hold and express very cheerful views of the situation and the outlook. Mr. James Shaw, of the Cwm-Avon Iron and Copper Works, Taiback, Glamorganshire, South Wales, writes to the *London Times* to say that whereas he, over the signature "Iron," warned his countrymen in January last against the evils of speculation in iron, he now perceives hopeful signs, and predicts a renewed period of good trade. He says:

The immense power of production suddenly brought into play has swamped the powers of consumption, great as these have been, and a demand, which was quite as much a gigantic speculation as a substantial reality, having subsided, prices have collapsed to a most extraordinary extent. For instance, Scotch pig iron, which was 73 per ton, has fallen to 35; hematite pig iron, which was 140 per ton, has fallen to 90; coke in plates, which were 32 per box, have gone down to 20 per box; and other articles in which speculation was rife have fallen in proportion. Bar iron, ship plates and angle iron, and other classes of iron which were free from the touch of speculation, have almost maintained the highest prices they reached. Parcels of iron in the hands of the speculators have been forced upon the market faster than merchants and consumers could absorb them, and the serious fall referred to has been the result. The Board of Trade returns for March show that great strides in shipments of all sorts of iron have been made, but even in face of these buyers were timid, and bought reluctantly during the rapid fall. These second-hand parcels are now almost cleared out, and what may now be expected to follow? In a few brief words simply this—further extension of production will cease; prices, which have now reached a safe and reasonable, as well as fairly remunerative limit, will encourage consumption and enterprise, and a solid, healthy state of business will supervene. Business has, to some extent, been disorganized by the elections, but these will soon be at an end, and the mercantile world will be reassured by having, at any rate, a strong government. There is a wonderful parallel between waves of commercial and political excitement. The commercial mob takes a fever, and for the time it is irresistible. It may be iron, cotton or corn, railway shares, mining shares or water shares; but while the seizure lasts it is omnipotent. The iron trade has just passed through one of these, and the effect will be to induce a greater spirit of moderation than has hitherto prevailed. With peace abroad, a good harvest in Europe, and good government at home, the prospects of the iron trade are excellent, and we may confidently look forward to a good summer and autumn trade, when the prices which have recently been reached will again be paid, not as the result of excessive speculation, but of sound trade overtaking the increased production called into existence.

This is very pleasant talk, but the weak point of so much of the argument as is based on the Board of Trade returns for March, is that the phenomenal shipments to this country during that month will not again be repeated, and that there is small prospect of further considerable orders from this country.

When the fact is realized that all the expectations based upon a continuance of the demand from this country are doomed to disappointment, and that the accumulations already here are steadily declining in value, owing to the sale of speculative lots which the importers cannot hold, it will be difficult to convince any one right away that what remains of the export demand is the basis of a satisfactory summer and autumn trade at the prices reached at the last advance.

More practical, because more exactly statistical, is the opinion of Mr. Bernard Samuelson, of Middlesbrough, an ironmaster of extensive experience. In a letter to the *Times* this gentleman says:

Next as to the increase of production at home. I shall presently show that it has been greatly overestimated; but I would first call attention to the fact that a large proportion of the ratio of increase took place in the last two months of 1879, and that if it had not occurred the production of pig iron in Great Britain for that year, which, even with this addition, was less with one exception (1874) than in any year since 1870, would probably have fallen quite 300,000 tons below 1878, and 600,000 tons below 1877. To show how abnormal had been the curtailment of the production of pig iron during the previous months of 1879, it is sufficient to mention that in November of that year only 35 furnaces remained in blast in South Staffordshire out of 143 built in that district, and that 28 have since been relighted. But the increase at the rate of 2,093,600 tons per annum, said to have taken place since that time, is greatly exaggerated.

Of the 143 furnaces stated, as above, to have been put into blast, the production of 115, including all those in the Cleveland district, which, with those in Cumberland and North Lancashire, are largest in productive power, has been ascertained. And it amounts to 1,514,000 tons, or 10,500 tons per furnace per annum. Taking the remaining 28 furnaces at the same rate, they would give a total increase at the rate of 1,487,000 tons, instead of 2,093,600, showing an overestimate of 600,000 tons. As the actual rate of excess has only been gradually reached, and as it is computed from a point below that of the average rate of 1879, it may not be far wrong to assume that if the present production should be continued throughout the year, the total output of pig iron in Great Britain for 1880 may reach 7,000,000 tons—of 250,000 tons in excess of that of 1879; 600,000 tons in excess of 1878, and 800,000 tons above that of last year. But in 1879 the home consumption of pig iron had fallen below that of any year since 1870, nearly 450,000 tons below that of 1878, and 700,000 tons below 1876, so that with a moderately good home trade, more especially for shipbuilding, such as we have now, the estimated production of pig iron for 1880 would not be formidable, even if the American demand should not be more than half that which, according to the estimate given above, it is likely to prove.

Lastly, as to the alleged glut of iron. The statement is made without any statistics to support it. The only available ones are those of the Cleveland Iron trade, from which it appears that the entire stock of Cleveland iron in the hands of makers, merchants and speculators, notwithstanding the largely increased production of the last five months, had fallen, on the 3d of April, to 257,000 tons, or rather less than seven weeks' production of the furnaces in blast. The Scotch statistics are incomplete, but it is beyond question that the consumption and exports of Scotch iron have latterly been far in excess of the production. I leave these facts to speak for themselves.

We should have more confidence in Mr. Samuelson's views if, in a portion preceding that above quoted, he had not figured out a legitimate American demand for 800,000 tons of British iron to supplement the deficient domestic production. Until we ascertain how the "authorities" will regard the situation when the American demand is left wholly out of account, we shall not know just what to think. If all the cheerful hopes for the future now expressed are realized, it is pleasant to know that we can spare a considerable amount of foreign iron for re-export, in case the demand upon British makers exceeds the capacity of their works. We are not so selfish as to refuse to share our surplus with foreign nations which may chance to need it.

The Life of Steel Rails.

We had occasion some time since to print a table giving what purported to be the record of the steel rails laid by the Illinois Central Railroad. This table had been ingeniously converted into a campaign document, so to speak, for those whose object it was to create the belief that American steel rails are inferior to those of English make, the ultimate end of this effort being to convince our legislators at Washington that the duty on steel rails ought to be reduced. We did not at the time attach much importance to the figures given, and were induced to make room for them only because wide publicity ought to be given to the exposure of the treacherous attempts made to slander the reputation of American rail makers. We return to the subject now to protest against the acceptance of those figures as furnishing any basis for a comparison of the product of this country and England, and desire to call attention at the same time to the hasty and unthinking manner in which such data are used. For convenience of reference, we repeat in its main features the table of record alluded to:

Works.	No. of rails laid.	Av. time in track (Months).	Total tons laid.	Av. time of use (Months).	Proportion failures.
John Brown.....	956	120	114,720	10	0.00
Barrow.....	6,371	75	477,825	10	0.11
Cambria.....	4,234	79	334,486	12	0.15
Cammell.....	22,674	40	906,960	15	0.15
Joliet.....	28,580	47	1,351,810	18	0.23
Union.....	33,913	30	1,017,390	20	0.30
North Chicago.....	54,712	47	2,575,264	22	0.24

Concerning first the nature of the data presented, it will be noticed that nothing is said in regard to the date of laying of the rails, so that we have no assurance that the amount of traffic passing over them was approximately equal; in fact, there is every reason to suppose that in this respect the manner in which the older English rails were taxed was far less severe. It is misleading and utterly inadmissible to base any com-

parison of quality of rails upon figures covering different periods of time, because the tonnage is variable, and because the failures of a lot of steel rails are not uniformly distributed over the time of service. This has been most admirably shown by Mr. Swank's figures, published in *The Iron Age* of November 20, 1879. The removals during the first few years are very small; then there is a sudden increase, culminating rapidly, and diminishing again after one or two years. Rails which have resisted destruction during this period may be looked upon as likely to be serviceable until diminished too much in weight by abrasion to be safe. In the light of these facts, it will be evident that the results given in the table are not comparable, especially as no facts are added relating to grade or alignment.

These insufficient data have served as a basis for a proclamation of the alleged superiority of English rails. Mr. Cope, assistant-secretary of the American Iron and Steel Association, has rudely exposed the little trick used in cooking the figures so as to produce the admirable and astonishing list of victors and vanquished drawn up in the last column of the above table. The following was the simple expedient adopted. The total number of bars furnished by each works is supplied by the average number of months they have lain in the track; the total number of bars that have failed is then multiplied by the average number of months they were in the track; the first product is then divided into the second product to get the apparent percentage of failures; and these percentages, regarded as whole numbers, stand in the last column of this table as representing the proportionate failures of the different brands. The absurdity of such a method of comparison and the fallacy of this mathematical demonstration are at once made manifest when we point out the fact that the longer the rails have worn which have been taken up, the worse standing does the mill get which rolled the rails.

Mr. Cope, correctly arguing that the percentage which the quantity of defective rails of each brand bears to the total quantity is a true, though not a conclusive, test of their quality, calculates the following:

Brand of rails.	No. of bars laid.	No. of bars removed.	Per cent.
John Brown.....	956	None.	None.
Cambria.....	22,674	53	0.23
Cammell.....	4,234	13	0.30
Joliet.....	28,580	178	0.62
Union.....	33,913	224	0.66
North Chicago.....	54,712	394	0.72
Barrow.....	6,371	54	0.85
Scranton.....	25,891	None.	None.

This way of looking at the matter seems "all wrong" to Mr. C. Robinson, secretary of Charles Cammell & Co., who states that Mr. Cope's figures "appear to have been hatched for the purpose of putting Barrow rails first in point of quality next the Atlas brand." Of this offense Mr. Cope will, no doubt, be acquitted. Mr. Robinson himself, however, sits down to hatch, and "by working out the percentages of rails that have failed of each given brand, by the time each 'has been laid on the track,' he produces the following:

Brand.	Percentage.	Months in Track.	Comparison of Failures.
John Brown.....	0.00	0	0.00
Cambria.....	0.23	40	0.575
Cammell.....	0.30	79	0.380
Joliet.....	0.62	47	1.380
Union.....	0.66	30	1.980
North Chicago.....	0.72	47	1.380
Barrow.....	0.85	75	1.390
Scranton.....	0.00	0	0.00

* Only nine months in use.

"Thus," says Mr. Robinson, no doubt conscious of not having labored in vain, "it will be seen that the brand 'Cammell' comes first, 'Cambria' second, 'Barrow' a bad third, 'Joliet' and 'Union' a dead heat, and 'North Chicago' sixth and last, as 'Scranton' only having been in the 'track nine months is nowhere.'"

For the glory of America, and the special benefit of Cambria, we now offer the following method, prefacing, however, that we are prepared, upon application, to devise some mathematical method by which the superiority of any other brand in the list will be clearly shown, always barring Scranton, to which, as every child will see, the palm really belongs. Like Mr. Robinson, we multiply Mr. Cope's percentages by the average life of each defective rail, and then obtain:

Brand.	Percentage.	Months' Life.	Comparison of Failures.
John Brown.....	0.00	0	0.000
Cambria.....	0.23	36	0.598
Cammell.....	0.30	38	0.950
Joliet.....	0.62	18	1.115
Union.....	0.66	20	1.320
North Chicago.....	0.72	22	1.584
Barrow.....	0.85	10	0.850

Cambria, it will be noticed, is far ahead, and we have thus succeeded in clearly showing to those who wish to decry the product of American steel rail mills, that figures which may be tortured into one shape are always sufficiently pliable to assume other, though less convenient, forms. Until better data are brought before American consumers, they must be content with accepting the evidence furnished in so minute and lucid a form by the records of the Pennsylvania Railroad, to which we have already referred.

A few days ago the French Chamber of Deputies reversed its decision reducing the duty on petroleum, "because a high duty would be a leverage toward a commercial treaty with the United States." This kind of legislation may be tried until the

crack o'doom without having any more influence on the action of Congress than the chatter of apes in Brazilian forests. If France really wants a commercial treaty with the United States, she would do well to begin negotiations by offering us something tangible in the way of benefits as an offset to the concessions demanded of us. All that M. Chotteau had to offer in exchange for the very substantial benefits we were asked to extend to French manufacturers of silks, wines, chocolate, &c., was what a clever critic of his scheme of reciprocity has called "a teaspoonful of pot luck." The trouble with France seems to be that she wants something for nothing, and we are not in the habit of trading on that basis. This reminds us that M. Chotteau has been the recipient of a letter from M. de Freycinet that will console him in part for his defeat. The following is an extract from this letter, cabled to this country:

The active and intelligent steps you have taken in the chief commercial and industrial centers of the American Union have already led to results of which I fully appreciate the utility. The current of opinion favorable to the development of commercial relations with France which you seem to have succeeded in forming, cannot fail to facilitate the task of the two governments before taking the initiative of opening negotiations. I have thought it expedient, however, to transmit certain instructions to the Minister of the Republic at Washington, in order to clear up sundry points which remain doubtful, and to enable him to inform the Federal government of the sentiments which animate us. You may rest assured that this important question will continue to have my earnest attention in the interests of both republics, and I should be glad to settle it with the government of the American Union.

We trust that in clearing up the points that "remain doubtful," M. de Freycinet has succeeded in clearing up the most doubtful one of all—in what respect we are to be benefited by any such treaty as M. Chotteau proposed. Altogether, this whole matter is very funny.

The Labor Situation.

The decided reduction in the price of iron, and the consequent attempt to reduce the wages of such of the mill and furnace labor in the West as is not governed by sliding scales, is bringing about serious trouble. Some manufacturers have concluded not to fight, but have simply shut down to await the outcome. Some who desire to run have asked for a reduction, in most cases only equal to the last advance made. In some instances this has been conceded; in others it has been refused, and the mills and furnaces are idle. At Pittsburgh, such mills as Jones & Laughlin's, Painter's and Byers' are idle from strikes. The Soho Furnace blew out early last week; both of the Eliza Furnaces and one of the Shoenberger Furnaces did the same, the other being run by the men who were willing to continue at the old rates. At Wheeling, there is a report of a strike at the puddle mills. This condition of the labor market is only another illustration of the truth of the remark of old Sam. Johnson: "Nothing generates discontent so much as fluctuation in profits and wages; for human nature is so constituted that a man will expect to have always what he has once received."

This state of the labor market will be further complicated by the large immigration now coming into this country, the arrivals for the first four months of this year being at the rate of nearly half a million for the entire year. The arrivals for April alone at Castle Garden were 46,119. The secretary of the Board of Emigration at Castle Garden reports that the demand for workmen from among these emigrants is very great. The inquiry for experienced ironworkers, miners, brickmakers, weavers, &c., being especially large, and the supply inadequate to the demand. In three of these trades, at least, strikes have been constant for the past four months. The members of these trades may protest that the labor markets of this country are overstocked, as perhaps they are, but labor cannot put itself outside of the pale of the universal law, that when anything commands a high price, be it wheat, muscle, or intelligence, to that place the surplus will flow and prices decline. If the flow of labor to this country continues, there will be a readjustment of wages in the near future that will be violent. The long-deferred fight in the Western iron mills may be near at hand.

The question of what the Lake Superior ore producers will do in regard to the contracts for ore for 1880, still continues to perplex the furnace and mill owners of the West, and in no less a degree the producers themselves. All sorts of rumors are flying about—some to the effect that certain of the ore companies have determined to make no reduction, and others that some concessions will be made. A number of conferences have been held at Cleveland the past two weeks between the consumers and producers, but if any result has been reached, we have not been advised as yet. The probability is, however, that in most, if not all, cases, some concessions will be made. Even if the furnaces and mills could be held to their contracts—which some regard as very doubtful, owing to certain conditions of contract—the question of policy—of what, under the circumstances, is best, not only for the mills and furnaces, but for the ore companies themselves—will lead the latter to make some concessions. An attempt to force the furnaces and mills to take the ore would result in innumerable lawsuits, the outcome of which would be doubtful. Large quantities of ore would be thrown on the market

to be disposed of at a heavy reduction, and if the furnaces could be compelled to take the ore under present conditions, it would surely cause the bankruptcy of many, and thus would in no sense benefit the ore producers. As a matter of right, the ore companies might insist on the contract being carried out; as a matter of policy, it is questionable if it is best to do so; while, as a matter of law, it is said to be doubtful if the contract could be enforced.

Ignorant Builders and Defective Constructions.

The Madison Square Garden disaster has called forth a burst of indignant reproach on the part of the press and people that will, it is hoped, cause a thorough investigation into certain departments charged with the inspection of buildings in this city, so that a repetition of so disgraceful a calamity will be guarded against and speedy justice visited upon those who are responsible for the disaster. About the cause there can be no shadow of a doubt, all accounts pointing unmistakably to the construction of the roof as flagrantly defective in design. The roof trusses, which were placed 16 feet apart from center to center, had a span of about 40 feet, and a total height at center of 6 feet. The main rafters were 8 by 6 inches, while the tie-beam was constructed in a most extraordinary manner. Instead of using a continuous beam, it was made in two parts, of 8 by 3 inch spruce timber, spiked together without keys or bolts. Two pieces butting together in the center constituted the one part, a hole being made through the stick for a 1½-inch iron bolt, which passed through the rafters at this intersection. The other part of the tie-beam was made up of three pieces. At the two points where these three sticks butted, the splices had been drawn apart. A number of braces were spiked to the rafters and tie-beams, the whole showing that the constructor did not have the faintest idea of what members were in compression and what in tension. On the trusses were 3 by 6 inch jack rafters 16 feet long, and these carried 1-inch boards covered with paper and tar roofing. The tie-beams being constructed with an utter disregard to the fact that they must resist a large tensile strain, depended for their effectiveness upon the resistance to shearing strain of the spikes. The latter naturally gave way gradually, the wall being forced outward and the tie beam breaking in the middle. The simple dead load of roof broke down a structure utterly incapable of resisting the comparatively small strains, and it is a matter of some surprise that it did not fail long ago. If we had had at any time during the last winter one of the series of snow falls, accompanied by occasional thaw and frost, which would pile a foot or more of a mixture of ice and snow on as flat a roof as this, the whole might have come down with a crash on the crowds which frequently gathered in the garden. Great as has been the calamity which has revealed the true nature of the structure, the loss of life under these circumstances would have been unparalleled. Such dangers threaten the public when ignorant builders are chosen by careless owners to put up monstrous combinations of timber, which are duly approved of by so-called inspectors whose fitness for office is probably gauged by their ability to secure and count votes at the polls.

Reciprocity with Canada.

Mr. Cox, chairman of the House Committee on Foreign Affairs, has reported an amended joint resolution requesting the President to appoint a board of three commissioners to confer with three to be appointed by the Canadian Parliament, "to ascertain and report on what basis reciprocal trade can be established" between the United States and the Dominion of Canada. At present it makes very little difference whether this resolution is passed or not, as the present Canadian government is not likely to appoint any commissioners to confer with those named by the President. Protection is now on its trial trip in Canada, and it is scarcely to be expected that the chief object sought by it—the exclusion of American manufactures from Canadian markets—shall be given up, or that any steps looking in that direction shall be taken. The idea entertained by some advocates of reciprocity, that the Dominion can be drawn into a commercial *zollverein* with the United States, giving free trade between the two countries and a uniform rate of duties, to be collected at the coast, on all foreign imports, is impracticable to the last degree. One difficulty is that our government could have no control over the Canadian Custom House regulations. The eccentricities of Treasury Department interpretation of revenue laws, of which we have had some experience in this country, might be exhibited in a still more conspicuous degree at Ottawa. It would be very easy to attract trade to Canadian ports and business to Canadian custom houses by constraining the law a little more favorably to importers than the authorities at Washington would care to. In fact, there is every practical difficulty in the way of such a project, and no plan by which it can be overcome. So long as Canada owes even nominal allegiance to the British Crown, so long we had better leave her alone. The time is not far distant when some radical change will be necessary. Burdened with an enormous public debt;

handicapped with great undertakings which can neither be abandoned nor carried forward; with a small population, not homogeneous, scattered over a large territory; offering few inducements to immigration and losing every year valuable strength in the emigration to this country; largely dependent upon the United States for commercial prosperity, yet willing to sacrifice their own interests to close their markets against us; neither dependent upon Great Britain nor yet independent—the immediate future of the Dominion is anything but bright. The only result of the force of maintaining so many governments—local, provincial and national—and of further moving in the direction they are now following, is inevitable bankruptcy. What will follow this it would not be safe to guess; but for the present we have nothing to gain by establishing different relations with Canada from those which now exist.

At such a time as this it is scarcely necessary to more than call attention to the unusual interest and importance of the information given in our market reports this week. Among our trade advices will be found a dispatch from Pittsburgh announcing that, at a meeting yesterday morning, the Western Iron Association reduced the card on merchant bar to 2.5-cent rate. This is a heroic cure of treatment, but it will be the sooner cure. It is no secret that the price has not been maintained, and that iron has been selling, East and West, below the nominal rates, though only in a very small way at any price. It is reported in Pittsburgh, on good authority, that forge iron has been offered there at prices so low as to justify a 2.50 rate on merchant iron. This course of the market will put a period to importations, and this is just what the manufacturers want.

NEW PUBLICATIONS.

PERCY'S METALLURGY—GOLD AND SILVER. Part I. John Murray, Publisher, London.

Dr. Percy's name is so widely known to all as the most thorough and the most authoritative writer on all pertaining to metallurgy, that the mere announcement of the fact that a work is written by him, will suffice to make those devoted to the specialty treated feel the necessity of closely studying it. A brief outline of its contents may, however, be welcome to some of the readers of *The Iron Age*, especially as the volume before us, constituting the first half of the completed treatise, does not speak of the processes which are prevalent in this country for the extraction of the precious metals, the distinctly American methods of stamping and amalgamating, and the chlorination processes being evidently reserved for the second part. To the latter, American readers will probably look forward with much expectation, and it is to be hoped that Dr. Percy's resignation of the professorship at the London School of Mines will enable him to bring it out at an early date. Fully one-third of the present volume is occupied by a discussion of the chemistry of silver, its alloys and compounds, a feature which all those who have had occasion to study the reactions of known processes, or examine those of new proposals or modifications, will know how to appreciate. This is followed by an elaborate series of chapters on assaying of silver. The first portion of the metallurgy of silver proper is its separation from metallic copper by the liquation process, and, as the latter has been quite generally superseded by better methods, this portion of the work is largely historical. The description of the processes adopted for parting silver and gold, and for refining the latter by chlorine, are of more direct practical interest. After treating of the Kongsberg and Wyandotte methods of silver smelting, Dr. Percy takes up combined silver and lead smelting, a subject which he has, however, quite elaborately dealt with in his former volume on the metallurgy of lead. The volume closes with a very detailed and admirable discussion of the Mexican or Patio and Cazo or Calderon process of amalgamation.

THE IRON AND STEEL WORKS OF THE UNITED STATES, 1880. Published by the American Iron and Steel Association. Price, \$3.00.

The directory of the iron trade published by the American Iron and Steel Association, is too well known and too widely appreciated to need commendation. Mr. J. M. Swank, the able Secretary of the Association, has, after much patient and conscientious labor, placed before the public a summary of the works of the United States which can be relied upon as being as closely correct to date as the circumstances will permit. During a time remarkable for numerous and far-reaching changes, and at a period when great activity has rendered delays in correspondence more frequent, Mr. Swank must have found it a difficult matter to secure prompt attention to his inquiries. This is much to be regretted, and we trust that the work which Mr. Swank has achieved in the face of such adverse circumstances, making it more meritorious, will convince the tardy ones of the error of their ways. We do not, of course, wish to be understood to imply that the completeness of the work is marred by any gaps or omissions, but a close examination of the details given for each works will show that, while they are very exhaustive in most cases, some interesting data are wanting with some. This, we know, is not due to any lack of zeal on the part of the compiler, but to a want of interest on the part of those to whom he has appealed. Mr. Swank has added as a new feature a directory of the rail mills of the United States, and has rearranged the works producing wrought iron direct in two classes, the one, embracing those making iron direct from the ore being given under the title of "forges," while those works which hammer blooms from pig or scrap iron are gathered under the heading of "bloomingeries." In conclusion we will only note that the new directory is considerably larger than that of 1878, its general appearance, however, being quite similar to the former edition.

Tariff Matters at Washington.

The New York Tribune has the following dispatch from Washington, dated May 4: The sub-committee, consisting of Messrs. Tucker, Carlisle, Gibson, Garfield, Frye and Dannel, which has been at work for two weeks preparing a revision of the tariff, reported this morning to the full Committee of Ways and Means. Their report was in the shape of a bill making many and radical changes in the present tariff laws. The following named articles are made exempt from duty and placed upon the free list: Salt, in all its forms, which now pays duty of 8 and 12 cents per cwt.; woolen rags, shoddy, mungo, waste and flocks, which now pay 12 cents per pound; bunting, which pays a specific duty of 20 cents per square yard and an additional duty of 35 per cent. ad valorem; books and all printed matter, engravings, maps, charts, &c., which now pay 25 per cent. duty; cod-liver oil, which now pays, crude, 20 per cent., and refined, 40 per cent.; chrome ore, now 20 per cent.; preserved or condensed milk, now 10 per cent.; all sorts of wood barks, now 10 per cent.; extract of hemlock, now 20 per cent.; types and type metal, now 25 per cent.; cut nails and spikes, which now pay a specific duty of 1½ cents per pound, and cast-iron bolts and hinges, which now pay 1½ cents per pound.

The revenue collected last year upon these articles, which it is now proposed to place upon the free list, amounted to \$1,253,936.23. The second section of the proposed bill provides that the duty upon all articles named in schedule A, of the existing law, shall hereafter be 30 per cent. ad valorem. This includes all manufactures of cotton, which now pay both a specific and ad valorem duty. The proposed rate is a reduction of about 35 per cent. from that fixed by the present law, and the loss to the government in revenue will be about \$500,000.

The duty upon classes 1 and 2 of schedule L of the existing law is reduced to 30 per cent. ad valorem. This includes all sorts of unmanufactured wools, from the sheep, alpaca, goat and other like animals, which now pay from 40 to 90 per cent. This means a reduction of about \$500,000 in the revenue. The duty on all manufactured woollen goods embraced in class 3, of schedule L, is placed at 20 per cent. ad valorem. This includes carpets, shams, blankets, flannels and all sorts of woollens, which now pay from 26 to 100 per cent. This means a reduction of about \$600,000 in the revenue. Upon all other articles in schedule L, the duty is reduced to 40 per cent. ad valorem. It now ranges from 50 to 90 per cent. The reduction in duty will cause a loss of about \$7,000,000 to the revenue. The reduction of duty upon iron and other goods as proposed by the new bill is as follows:

Upon steel railway bars, from 1¼ to 1 cent per pound; upon locomotive tires, from 3 cents to 1 cent per pound; upon anchors, from 2¼ to 1¼ cents per pound; anvils, cables, cable chains and chains of all sorts, from 2¼ to 1¼ cents per pound; horseshoe nails, from 5 to 2½ cents per pound; screws, hinges, board nails, spikes, rivets, bolts, &c., from 2¼ to 2 cents per pound; mill iron, and iron for steamships and locomotives, to 30 per cent. ad valorem; cutlery, files, saws, &c., to 25 per cent.; chromate and bichromate of potash, from 4 to 2 cents per pound; upon dye and coloring matter, from 60 to 30 per cent.; lead ore and lead in sheets, pipes, shot, pigs or bars, from 50 to 30 per cent.; all descriptions of copper, from 45 to 25 per cent.; upon percussion caps, between 30 and 45 per cent.; upon wood pulp, from 20 to 10 per cent.; flax of all sorts, from \$25 to \$10 per ton; paper of all sorts, from 20 to 15 per cent.; and on manufactures of paper, from 35 to 25 per cent.; upon agricultural implements, carpenters' and miners' tools the duty is reduced from 35 to 25 per cent. The loss of revenue that will come from this change amounts to about \$1,000,000. The sugar schedule is fixed as follows: On Malado, 1.87½; not above No. 7 Dutch standard and not testing above 85°, 2.18½; above No. 7 and not above No. 13, and testing not above 92°, 2.50; above 13 and not above 16 and all sugars testing above 92°, 2.80; above No. 16 and not above No. 20, 3.17; above No. 20, 3.67. The duty on opium is increased from \$6 to \$10 per pound.

The aggregate decrease of revenue that will follow the changes contemplated by the bill will amount to about \$11,000,000 annually. The full committee will consider the bill to-morrow, and have agreed to vote upon it at half-past 11 Thursday morning. There is said to be a majority of the committee who favor the bill. It will receive all of the Democratic votes and that of Mr. Dannel, a Republican. The high tariff men concede that the bill will be reported favorably to the House.

(From Our Own Correspondent.)

WASHINGTON, D. C., May 5, 1880.

It was expected that the Committee on Ways and Means, at their meeting yesterday, would reach a conclusion on the proposed new tariff bill; but, owing to the conflicting interests, they were unable to arrive at any result.

At a meeting of the committee several days ago, by a majority vote, it was decided not to incorporate in the new bill any legislation which would affect the status of iron or steel. This announcement gave much satisfaction to the friends of these great industries, and it was supposed that they would be allowed to rest, at least for the remainder of the present session. At a subsequent meeting, however, the same question was brought before the committee and their previous action was reversed, and it has now been determined to incorporate manufactures of iron and steel rails in the bill over which the committee is now deliberating. The Democrats of the sub-committee in charge of the preparation of this bill are determined to report a measure of some kind, and, with this view, have been compelled to take in a large number of articles in order to satisfy the different interests represented on the committee. Another effort to secure a vote will be made to-day. It is now admitted by Mr. Tucker, who is

chairman of the sub-committee, and by members of the general committee, that it will not be possible to secure any concurrent legislation on tariff matters at the present session, but that the bill will be reported and an opportunity afforded for limited debate.

The difficulty experienced by the Ways and Means Committee in agreeing upon a tariff proposition to meet all the conflicting views, has greatly stimulated the feeling in favor of the proposition submitted by Senator Cameron, of Pennsylvania, for the appointment of a commission to have charge of all matters relating to the tariff.

The object of this proposition is, if possible, to take the tariff entirely out of politics, as it is generally admitted that the constant agitation of the questions involved in this important measure exert a very depressing and disastrous influence upon the most important branches of American industry, and that it would be infinitely better for political parties to make their issues on other subjects than one so vitally important to the prosperity and wealth of the country. It is more than likely that if any legislation whatever bearing on the tariff is had at this session, it will be this or some proposition embodying the same general features.

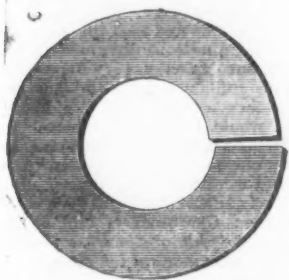
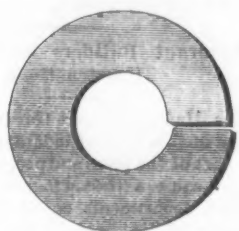
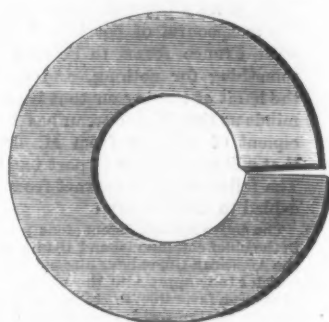
Enameling Hollow Ware.

The processes used in enameling hollow-ware are generally so closely guarded as a trade secret that trustworthy information rarely reaches the public. Some interest may, therefore, attach to the following account of the methods and mixtures used by a prominent establishment in Silesia, Germany, where quite a large number of works have produced enamelled hollow ware for many years. After being cleaned, the castings are pickled in dilute sulphuric acid and are scrubbed with sand. They are then dipped into hot water and dried, when they are ready for the body, which is made as follows: 50 parts of finely-ground dry quartz, 22.5 parts of crystallized borax and 7.5 parts of fine fluorspar are entered in a clay crucible, yielding 68.5 to 69 parts of a mass, which, after being carefully sorted to keep out impure pieces, is reduced to powder. Sixteen parts of this sintered mass are mixed with 6.5 to 12.5 parts of quartz, 4 to 6.5 parts of gray clay and 0.5 parts of borax. While this is being ground with water, 2.5 parts of clay and 0.66 parts of borax are added. After being brought to a proper consistency by the addition of water this mixture is applied with a brush, dried and burnt on yielding a yellowish, brown sintered body, which adheres to the iron firmly. The hollow-ware is allowed to cool, and the material for the glaze is put on as a fine wash. This glaze is prepared by mixing 25 parts of fluorspar, 1 part of commercial oxide of zinc, 4.75 parts of oxide of zinc as obtained from the calcining furnace of the establishment, 0.75 parts of bone ash and 0.03 to 0.05 parts of small. The latter ingredient is added to counteract any yellowish tinge in the enamel. This mixture is looked upon as constituting the secret of the establishment, and it is specially prepared in the laboratory; 9 to 9.25 parts of it are mixed with 16 parts of feldspar, 9 to 9.75 parts of crystallized borax, 3.25 parts of crystallized soda and 1.25 to 1.50 parts of saltpeter. The whole of it is put into a refractory crucible, having a hole in the bottom, through which the fused mass falls into a vessel placed below the grate. The cooled mass is finely ground with water, and to 30 parts of it 6 pieces of white clay, about 10 cubic inches in volume each, and 0.3 parts of oxide of zinc are added. The mass thus prepared is applied with a brush, and after being dried, the goods are exposed to a heat sufficient to produce the enamel required.

The Iron Ore Mines of the Belleville District.—The stimulus of high prices seems to have had the effect not alone of causing a rapid development of the mining resources of this country, but of the Dominion also. Reports, for which we are indebted to T. W. Prince, United States Consul at Belleville, Canada, state that the shipments from the Belleville district to this country have, during the first three months of the year, aggregated 6500, of which two-thirds were hematite ores, while the rest was magnetite. This is quite a large amount when it is considered that wet weather has interfered with the shipments. The principal mines are the Dominion, located about four miles west of Madoc, from which the ore must be hauled three miles through bad roads to the railway. The Seymour mine is more favorably located in this respect, being connected with the railroad by a tramway. The Brooks mine has been developed only recently, but is said to give promise of becoming a large producer, owing to the character and location of the deposit. A second district of importance is the Snowden district, about 70 miles north from Port Slope, on the line of the Victoria Railroad, the ore being of a quality similar to that of the Madoc district.

The Brush Electric Light in England.—The British government has given an order to the Anglo-American Electric Light Company, of London, which recently bought the English patents from Charles F. Brush, of Cleveland, for 24 of the largest size Brush machines and 432 lamps. The order, which was received by cable recently, requests the Telegraph Supply Company to begin their manufacture at once. The order amounts to nearly \$100,000, and when filled will make the number of Brush lights in operation about 3000. The lights are for the use of the British Navy, and the Brush light was selected after a thorough trial of all foreign lights—a fact which will be regarded as a great triumph for a growing American industry. The order was sent to this city because the British company is not yet in shape to manufacture, and the government wanted the lights immediately.

Some idea of the thrifty habits of the French may be gathered from the fact that the sum of \$153,800,000 was deposited in savings banks in France during the last year, and that the number of depositors exceeded 2,600,000 persons.

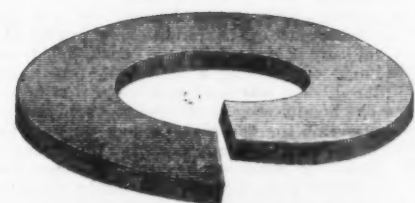
For $\frac{1}{8}$ inch Bolt.For $\frac{3}{16}$ inch Bolt.For $\frac{5}{16}$ inch Bolt.For $\frac{7}{8}$ inch Bolt.

Branch Office & Warehouse, 40 Dearborn St., Chicago.

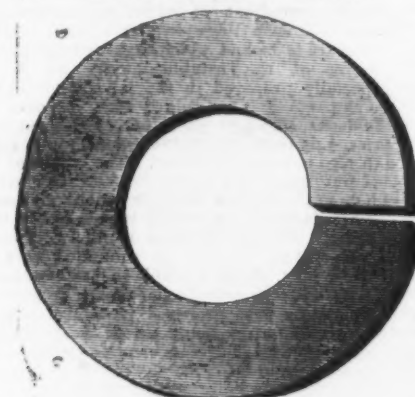
THE VERONA TOOL WORKS.

Factory, Verona Station, A. V. R. R.

Office and Address, LIBERTY ST. & SEVENTH AVE.,



For 1 inch Bolt.



**METCALF,
PAUL & CO.,
PITTSBURG, PA.**

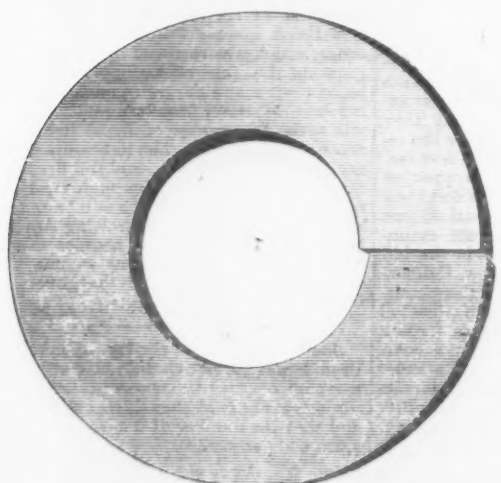
For $\frac{7}{8}$ inch Bolt.

To the Iron and Hardware Trade, and Manufacturers of Bridges, Locomotives, Cars, Machinery, Agricultural Implements and Wagons :

Your attention is called to a New Article of Manufacture, which we are now ready to introduce,

THE PATENT VERONA SPRING WASHER,

To be used FOR HOLDING NUTS PERFECTLY TIGHT, in any place where it is desirable to do so.

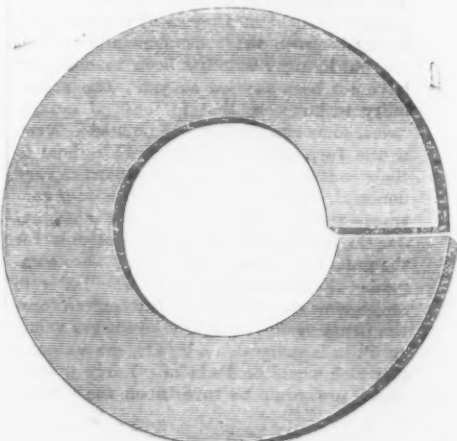
For $1\frac{1}{4}$ inch Bolt.

This Washer is made on the same principle as our celebrated Patent Verona Nut Lock, and will be just as valuable on Machinery, Cars and Bridges as our Nut Lock is on Railroad Joints.

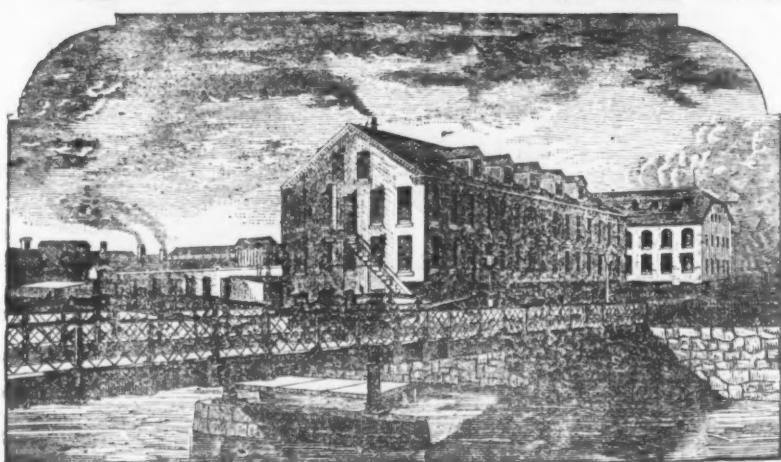
We make the following sizes : $1\frac{1}{4}$ in., $1\frac{1}{8}$ in., 1 in., $\frac{7}{8}$ in., $\frac{3}{4}$ in., $\frac{5}{8}$ in., $\frac{1}{2}$ in., $\frac{3}{8}$ in., $\frac{1}{4}$ in., and are prepared to fill orders for any quantity. When ordering, give size of bolt.

This Washer, being made of fine steel, carefully tempered and tested, has great elasticity, AND IS THE MOST DURABLE KNOWN.

Prices and Samples can be had by addressing either our Pittsburg or Chicago House.

For $1\frac{1}{4}$ inch Bolt.

SEYMOUR'S SHEARS AND SCISSORS.



HENRY SEYMOUR CUTLERY CO.,

MANUFACTURERS OF

Full Nickel Plated and Maroon
Japan Handle

Shears & Scissors

EVERY PAIR WARRANTED.

Sold by Hardware dealers throughout the country.

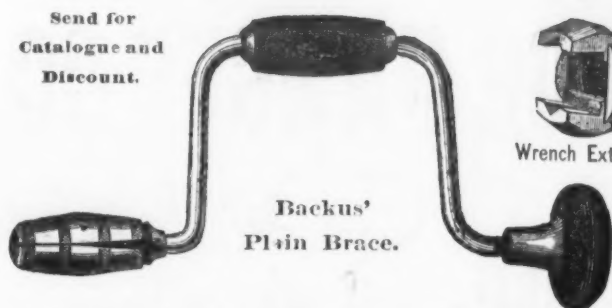
Salesrooms,

84 and 86 Chambers Street, New York City.

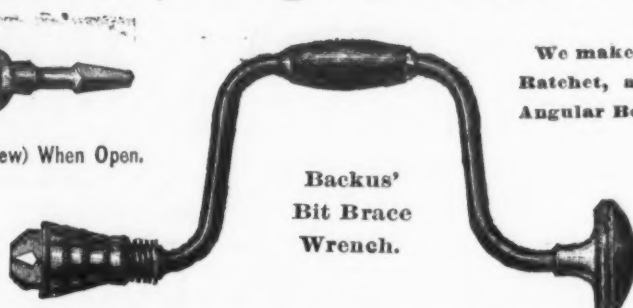
Manufactory, HOLYOKE, MASS.



Q. S. BACKUS' New Improved Bit Braces, Ratchet Braces, Bit Brace Wrenches, Angular Borers, &c.

Send for
Catalogue and
Discount.Backus'
Plain Brace.

Wrench Extension (New) When Open.

Backus'
Bit Brace
Wrench.We make the Brace Wrench with
Ratchet, and also apply it to our
Angular Borer.Backus'
New Ratchet
Brace.All Bit Brace
Wrenches are
Nickel-Plated.

Having done away with the objectionable *Inner Jaws*, which we found could not be applied with entire satisfaction to all kinds of Bits, we take pleasure in presenting to the mechanic a Brace which, by its adjustability to every *size and size of Bit*, makes it absolutely perfect, and we think the best Brace ever offered in the market.

No mechanic should be without this tool, combining as it does all the advantages of the regular Bit Brace, holding firmly Bits of all sizes, from the smallest to the largest, while at the same time it is a perfect Socket Wrench, with which Nuts and Bolts from $\frac{1}{4}$ to $1\frac{1}{4}$ inches can be turned with great rapidity, and to a great extent doing away with the need of the old-fashioned screw wrench.

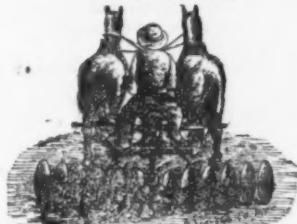
Having done away with the objectionable two pawls worked by a lever, which was often found to be in the way, we now offer a ratchet which we feel cannot possibly be improved; using but one pawl worked by a simple ring, by turning which from one to the other of the three small notches, you set the ratchet so as to work either to the right, left, or stand rigid.

Some of my friends and customers having made inquiries with regard to certain published threats, referring to a patent decision on my old and discarded styles, I take pleasure in announcing that they need have no apprehension from that source whatever.

Q. S. BACKUS, 102 Chambers Street, New York.

NEW YORK STATE AGRICULTURAL WORKS, Established 1830.

LA DORR'S



Jointed Pulverizing Harrow.

WHEELER & MELICK COMPANY,

Patentees and Manufacturers of

Railway & Lever Horse Powers, Wheeler's Vibratory Threshers & Cleaners.

Ellis's One and Two-Horse Threshers and Cleaners, Threshers and Shakers, Straw-Preserving Rye Threshers, Eagle Hand and Horse Dumping Rake; La Dorr's Jointed Pulverizing Disc Harrow, the only Disc Harrow that will thoroughly pulverize the ground, leave it smooth and cover the seed; Tolley's Champion One and Two-Horse Cultivator with patent screw teeth Steam Engines, Dog and Pony Powers, Wood Sawing Machines, Shingle Machines; La Dorr's Disc Corn Cultivator, unequalled by anything for cultivating corn or any rowed crop. All machines made of first-class material, and are the best machines for export and home trade. Having been established nearly fifty years, our reputation is second to none.

Send for illustrated circular and report of Centennial Trial.

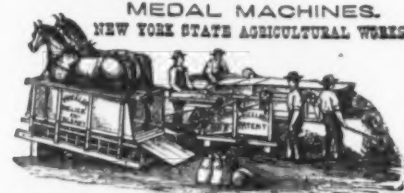
WHEELER & MELICK COMPANY,

Albany, N. Y., U. S. A.

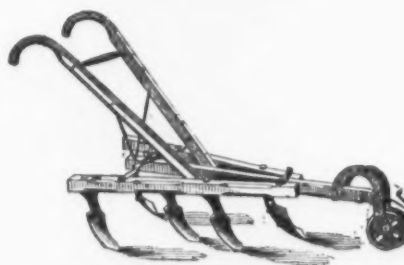
WHEELER'S

MEDAL MACHINES.

NEW YORK STATE AGRICULTURAL WORKS.



Horse Power and Thresher and Cleaner.



Tolley's Champion Cultivator.

THE HARTFORD COMPRESSED-AIR PUMP.

Water Driven to any Height and Distance by Compressed Air.

Country Houses Supplied Cheaply and Certainly for Bath Rooms, Water Closets, Hot and Cold Water Faucets, &c.

Plenty of Fresh Water for Stock on Farms.

The Best Pump for Irrigating, Supplying Railroad Tanks and for Mining Purposes.

This pump is being introduced into all the foreign countries, and is accepted by all mechanical men as the very best Pump in the market. It is more durable and needs less repairs than any other apparatus for like purposes, and is therefore the cheapest in the end, if not at first. Its advantages over other Windmills, Rams, and other contrivances for raising water, are quickly seen. For Circular and Price List address

THE HARTFORD COMPRESSED-AIR PUMP CO.,

EZRA BROOKS, Sec. and Gen'l Manager,

HARTFORD, CONN., U. S. A.



MOSES GOLDSMITH & SON,
Key Box 156,
CHARLESTON, S. C.
Wholesale dealers in
METALS, IRON, RAGS,
And all kinds of Paper Stock.
We invite correspondence.

THE IRON LINE,
FOR THE TRANSPORTATION OF
IRON, IRON ORE, COAL, &c.,
Between
Lake Champlain, New York, Philadel-
phia, Pa., Wilmington, Del.
For Freight apply to F. W. STARK, 33 Coenties Slip,
N. Y., JOSEPH PHILBRICK, 407 West Girard Avenue,
Philadelphia, Pa.

NATIONAL STEAM PUMP.
Adapted to every possible Duty.
Send for Illustrated Catalogue.
WM. E. KELLY,
New Brunswick, N. J.
New York Salesroom, 40 Cortlandt St.

ANCHOR BRAND
AXLES.
For all Styles Carriages and Wagons.
Annual production 180,000 sets.
SHELDON & CO., Auburn, N. Y.

TACKLE BLOCKS.
Rope and Iron Strap of all kinds. Lig-
numvitæ Wood for Ten-Pin Balls.
Wm. H. McMillan & Bro.,
Office, 113 South Street, New York.
Factory, 32 to 40 Penn St., Brooklyn, N. Y.

J. R. TORREY, Manufacturer of Razor Strops.

Office and Factory, 34 Southbridge St., Worcester, Mass.



Superior to any other in the market.
Our Strops, in quality, style and variety are unequalled, and we have facilities for production greater than any other manufacturer in our line. Price Lists on application.

J. R. TORREY RAZOR CO.,

Office and Factory, 34 Southbridge St., Worcester, Mass.



No. 451 I.



No. 10

Our Razors, in temper and workmanship, are not surpassed by any of foreign make, and are fully guaranteed in every respect. Price Lists on application.

THE SPRACUE NOVELTY WORKS, Rochester, N. Y.,

SOLE MANUFACTURERS OF

Sprague's Perfection Razor Strop.

Sprague's Combination Razor Strop.

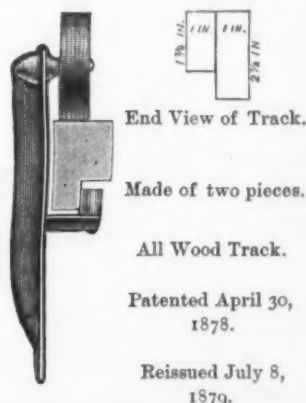
Sprague's "Iron Bound" Boot Polish.

Sprague's Combination Ice Tool.

Sprague's "Star" Metallic Post Box.

WIRE POTATO MASHERS, HATCHET HAMMERS, WIRE RING POT CLEANERS, &c., &c.

Send for prices and illustrations of each and everything we make.



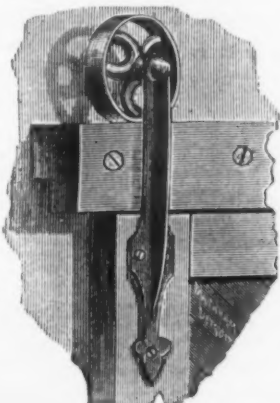
End View of Track.

Made of two pieces.

All Wood Track.

Patented April 30, 1878.

Reissued July 8, 1879.



THE KIDDER SLIDE DOOR HANGER CO.

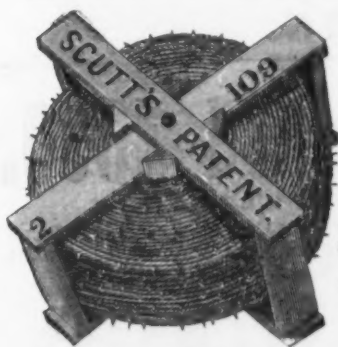
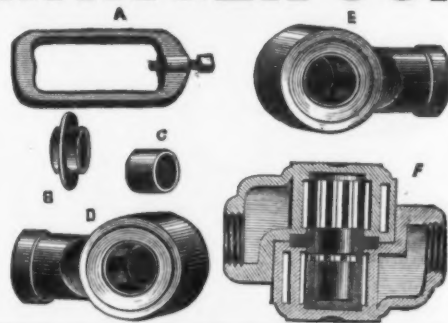
ROMEO, MICH.,

SOLE MANUFACTURERS OF THE

"KIDDER" BARN DOOR HANGER.

No Iron Rail, and cannot be thrown off the Track, Least Noise, Easiest Running,

And the cheapest Hanger to the user made. For sale by the wholesale trade generally. Also sole agents for **MORTON'S NEW REVERSIBLE CHECK AND PUMP VALVE**, two valves in one. Every valve warranted. Will outwear five common valves. Sixty days' trial given, and if not satisfactory, no sale. Send for circulars.



SCUTT'S PATENT FOUR-POINTED STEEL BARBED CABLE FENCE WIRE.



The cable is formed in the same manner as the great cables used in bridges, and has a tensile strength double that of any twisted wire. It is the only barbed wire so manufactured. Both wire and barb material are manufactured especially for our use from the finest grade of Siemens-Martin steel. Our wire offers double the protection afforded by any two-pointed barb, each rod giving 128 points, while two-pointed barbs give but 64. It is the most attractive in appearance, and the best selling wire in the market, and, by actual tests, the strongest, lightest and consequently the cheapest.

We manufacture under license from the Washburn & Moen Mfg. Co., and all danger of law suits is avoided in the purchase of our goods. We manufacture both painted and galvanized. The only Solid Steel Four-pointed Barb. Send for circulars and price list.

H. B. SCUTT & CO., Buffalo, N. Y.

Represented in New York by GEO. L. SQUIER & BRO., 195 Water Street.



HALL'S PATENT DOUBLE COMPOUND LEVER CUTTING NIPPERS.

NEAT, HANDY, POWERFUL AND DURABLE.

Every pair warranted to cut steel wire.
Extra parts supplied to replace those damaged by wear or accident at a trifling cost.
Can be adjusted by any one in a few seconds.
Made entirely of steel, drop forged.

Send for Price List.

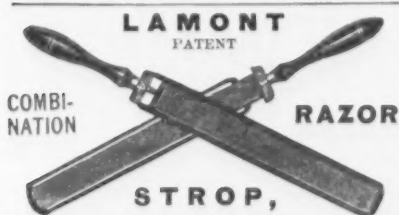
Manufactured by
THE INTERCHANGEABLE TOOL COMPANY, of New York.
Manufacturers of Special Tools and Machines on the Interchangeable System.

All orders should be addressed to

A. CUSTAM, Gen'l Agent, 32 Howard St., New York.



PECK & HEMIS, Jobbers of Rubber Goods, manufacturers of Leather Belting and Leather Fire Hose. Sole agents for Hoyt's celebrated Oak Tanned Belting, also N. Y. Belting and Packing Co.'s goods. Ladies' and Gents' Water-proof Garments. 175 Superior St., Cleveland, O.

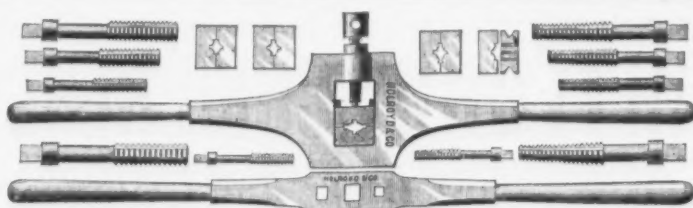


Manufactured by **COPELAND, HALL & Co.,** (Successors to H. O. Hall & Co.), Rochester, N. Y.



EMPIRE FORGES.

Improved, Without Belts, Bellows, Crank Pins, Dead Centers or Back Motion. Send for circular. Empire Portable Forge Co., Cohoes, N. Y.



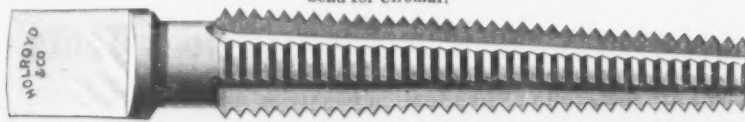
HOLROYD & CO., Waterford, N. Y.,

Manufacturers of

STOCKS AND DIES,

For Blacksmiths, Machinists and Gas Fitters.

Send for Circular.



Iron and Brass Wood Screws.

We manufacture a full line of
IRON AND BRASS SCREWS.

Quality, finish and tests as to strength, guaranteed equal to any in the market. With improved facilities and largely increased capacity for production, we can fill orders promptly, and invite inquiries for discounts.

Philadelphia Screw Co., Limited,
Twelfth and Buttonwood Streets,
PHILADELPHIA.

THE SLAYTON RAZOR.



This cut is exact size of Razor.

PERFECTION

FOR PORTABILITY.
FOR CUTTING QUALITY.
FOR TEMPER.

Handles of German Silver, Nickel Plated. Blades of the Finest Steel in the World. Every Razor Fully Warranted.

L. C. TOWER, Thermometer Manufacturer,

Canvassers Wanted.

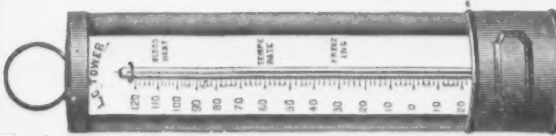
39 Exchange St., Rochester, N. Y., Sole Agent.

L. C. TOWER

Manufacturer of

Thermometers

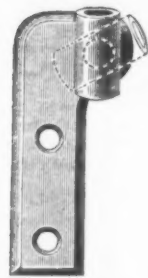
Of Every Description,
Rochester, N. Y.



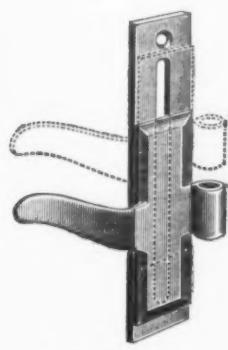
DEARBORN'S PATENT FIXTURES



INSIDE VIEW.

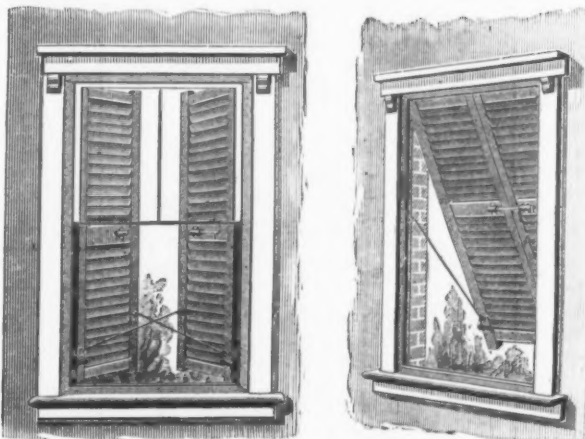


UPPER HINGE.



LOWER HINGE.

FOR AWNING BLINDS.

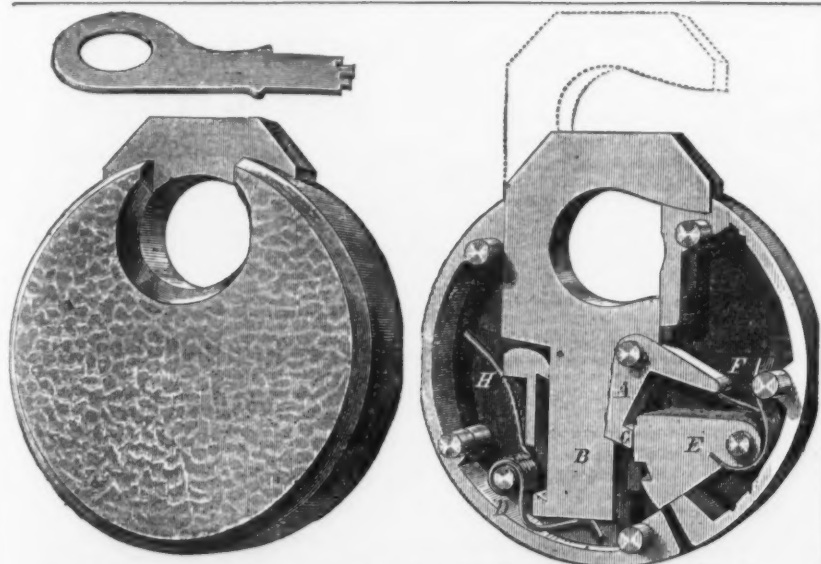


GREATLY IMPROVED.



These fixtures are now made larger and heavier, so as to fit Blinds of Any Regular Size or Thickness. They are heavily tinned to prevent rusting and insure easy working. Parts have been added, so that the Blinds may be adjusted readily to five different positions, excluding the sun from any direction. The Fixtures are made of Malleable and Wrought Iron, and are strong enough to hold any blind securely against the wind. They have been thoroughly tested for three years, and given perfect satisfaction to the thousands who have used them. Full illustrated directions with each set. Warranted to work perfectly if properly applied. For Price List of Feb. 15, 1880, and full particulars, discounts, &c., address

BOSTON BLOWER CO., Sole Manufacturers,
BOSTON, MASS.



BRASS PADLOCKS. GREATLY IMPROVED.

For simplicity, compactness, durability, convenience and security they have no equal. Appreciated by all who use them. The best and most economical Padlock for all uses extant. Springs now made of the celebrated Phosphor-Bronze. We make these Locks with Master Keys when so ordered. Largely used by the U. S. Government, Railroads, Corporations, &c.

D. K. MILLER LOCK CO.,
821 Cherry Street, Philadelphia.

LYON'S HAND OR POWER PUNCHES AND SHEARS.

For Round, Flat or Square Iron,

ALSO,

Polishing & Buffing Machinery,

HYDRAULIC JACKS,

To raise from 2 to 120 tons.

HYDRAULIC PRESSES,

For special and general use.

HYDRAULIC HAND & POWER PUMPS

with 1 to 6 plungers, to run hydraulic presses, with either uniform or changeable speed.

Second-Hand Presses.

E. LYON & CO.,

470 Grand Street, NEW YORK.

Send for circular of what you want.

PUMPS PHILA. HYDRAULIC WORKS,
AND PHILADELPHIA.
AIR COMPRESSORS.

Ajax, Jr.,
AND

**Hebe
LAWN MOWERS,**

Manufactured by

L. WILDER,
Hoosick Falls, N. Y.



These Machines stand unrivaled, having many points of novelty which are superior to all other Lawn Mowers. The cutting is done by a series of spiral knives operating against the ledger blade. They are so constructed that they will allow the tall grass to pass in between them and approach the ledger blade, as the machine moves forward, while the wipers reach around the grass and bring it against the knife, which cuts it off, thereby preventing the machine from clogging and cutting the grass more than once.

POINTS OF SUPERIORITY.
They will cut grass of any height.
They run the easiest.
They are the easiest to sharpen.
They have the latest improved noiseless ratchet.
They will cut the grass the smoothest.

Every part, where found necessary, is made of malleable iron and steel.
Width of cut, 15 inches.
Every part is interchangeable.

FOR SALE BY

LEONARD & MCCOY, 118 Liberty Street, New York.

DURFUR & CO., Baltimore, Md.

WM. L. BOYER & BRO., Philadelphia, Pa.

J. H. & W. E. COLE, Hartford, Conn.

E. H. VALENTINE, Chicago, Ill.

W. J. KINSEY, Denver, Col.

FRANK BROS., San Francisco, Cal.

WOOD, SHOOD & CO., Christ Church, New Zealand.

Established
1855.

KEYSTONE WORKS.

Centennial Award
1876.

GEORGE GRIFFITHS,

MANUFACTURER OF



**Shovels, Spades, Scoops,
Coal Hods, &c.,**

**Nos. 511, 513 and 515 LOCUST ST.,
PHILADELPHIA, PA., U. S. A.**

Send for Price List.

PURE EMERY,

Manufactured from
The Finest Turkish Ore
BY CHARLES ALDEN.

Consumers will find it to their interest to apply direct to our mills and save the commissions of middlemen.

Assorted Sizes Always on Hand.

Quality, grades and prompt execution of orders guaranteed. Address

The Ashland Emery Co.,

PERTH AMBOY, New Jersey.

**SIBLEY'S
IMPROVED LEVELING INSTRUMENT,**



Mounted Complete. Price, \$10.

Trade supplied with one or two instruments at a fair discount. When ten or more instruments in all are ordered, a special discount will be given from the first. Catalogue containing full directions mailed on application.

BICKNELL & COMSTOCK, Proprietors,
27 Warren St., N. Y.

**The President
LAWN
MOWER.**



The most beautiful and perfect Mower ever offered. A complete assortment of Ten Sizes. Hand machines, \$10 and upward. New Pony Mower, \$55. Horse Mowers, \$60 and \$100. Acknowledged at home and abroad the Lawn Mower par excellence. Easily operated, noiseless and incomparably the most durable. Compare the President with all others and Buy the Best.

CARR & HOBSON, 47 Cliff St., Two doors from Fulton.
PAGE, FARGO & CO., 325 Broadway.

Book Stock..... 3 1/2 c. @.....
Newspapers..... 2 1/2 c. @.....
Waste Paper and Scraps..... 1/2 c. @.....
Kentucky Bale Rope..... 4 c. @.....

EXPORTS

Of Hardware, Iron, Machinery, Metals,
etc., from the Port of New York, for the
Week ending May 4, 1880:

Danish West Indies.

Quant. Val.

Coal, tons..... 504 1/2 1,512

Mf. iron, pkgs..... 10

Hamburg.

Plateware, cs..... 8 680

Sew. mach., cs..... 104 13,584

Plateware, cs..... 100

Ag. imp. pkgs..... 155 14,838

Mach., cs..... 59 6,845

Tinware, cs..... 20 2,060

Nails, kegs..... 6 283

Lub. oil, bbls..... 165 2,062

Ptms, gals..... 260 260

Hdw., cs..... 130 4,765

Gun, cs..... 1 100

Iron pipes..... 670 4,380

Belting, cs..... 1 561

Pumps, pkgs..... 7 1,148

Cutlery, cs..... 2 200

Mf. iron, pkgs..... 8 840

Glassware, cs..... 10 200

Teleph., cs..... 19 2,130

Bremen.

Lub. oil, bbls..... 115 928

Hdw., cs..... 17 1,234

Mf. iron, pkgs..... 100

Ag. imp. pkgs..... 131 4,111

Car..... 1 800

Ptms, gals..... 350 350

Tinware, cs..... 3 300

Belting, bales..... 1 60

Mach., cs..... 4 275

Dutch West Indies.

Ptms, gals..... 306 471

Mf. iron, pkgs..... 9 200

Mach., cs..... 1 153

Windmills..... 1 79

Hdw., cs..... 25 396

Stockholm.

Pumps, pkgs..... 10 450

Amsterdam.

Ptms, gals..... 210 16,000

Antwerp.

Ag. imp. pkgs..... 4 458

Crucible, pkgs..... 27 350

Belting, bales..... 4 750

Hdw., cs..... 24 661

Dutch East Indies.

Ptms, gals..... 258 25,765

Newcastle.

Lub. oil, gals..... 758 300

Havre.

Silverware, cs..... 1 550

Lub. oil, bbls..... 10 101

Mach., cs..... 3 975

Ag. imp. pkgs..... 330 20,130

Hdw., cs..... 20 55

Windmills, pgs..... 11 350

Marseilles.

Ag. imp. pkgs..... 18 2,175

Bay.

Ptms, gals..... 341,376 27,130

Seville.

Ptms, gals..... 56,000 6,160

Bilbao.

Ptms, gals..... 87,580 9,500

Cuba.

Ag. imp. pkgs..... 27 616

Glassware, cs..... 36 1,184

Mach., cs..... 12 438

Hdw., cs..... 85 1,176

Belting, cs..... 18 305

Sew. ma., cs..... 18 305

Ptms, gals..... 243,100 23,025

Lead, rolls..... 13 202

Hoops, bbls..... 166 2,666

Mf. iron, pkgs..... 27 1,110

Mach. oil, gals..... 815 535

Windmills..... 13 198

Nails, kegs..... 221 1,047

Car..... 1 800

Gas fixt., pkgs..... 6 62

Brass, cs..... 88 8,900

Pumps, pkgs..... 3 120

Steel plate, cs..... 2 74

Coal, bbls..... 60 280

Porto Rico.

Coal, tons..... 13 68

Sew. ma., cs..... 20 621

Tacks, case..... 1 54

Iron safes..... 4 797

Hoops..... 30,000

Plateware, cs..... 2 75

Hdw., cs..... 36 77

IMPORTS

Of Hardware, Iron, Steel and Metals into
the Port of New York, for the Week ending
May 4, 1880:

Hardware.

Banmaganman H.

Tools, chest, 1

Barbour Bros.

Machinery, cs, 3

Baw & Dwyer.

Hdw., cs, 5

Bloomfield J. C. & Co.

Mach., cs, 2

Boker Hermann & Co.

Hdw., cs, 201

Hdw., cs, 14

Hdw., cs, 14

Brookline Wm.

Grindstones, bbls, 5

Razors, bbls, 2

Burkshaw C.

Hdw., cs, 1

Cazaux H.

Gal. wire, pkgs, 377

Wire, pkgs, 149

Charles R. P.

Grind. stones, 4700

Clements Thos.

Ag. imp. pkgs, 1

Collins & Co.

Hdw., cs, 2

Corbin L. & F.

Fig. a lot

Crossman Bros.

Axles, cs, 1

Broken axle, 1

Degrauw, Aymar & Co.

Chain, cs, 18

Chain, lengths, 3

de Planque E.

Cutlery, cs, 5

de Rivers J. & Co.

Old mach., pkgs, 3

De Witt Wire Cloth Co.

Mdse, pkgs, 8

Drexel, Morgan & Co.

Hdw., cs, 9

Hdw., cs, 5

Dreyfus, Weiler & Co.

Hdw., cs, 3

Field Alfred & Co.

Chain, cs, 10

Hdw., cs, 2

Folsom H. & D.

Mdse, pkgs, 4

Friedmann & Lauter-

jung,

Mdse, pkgs, 4

Furness, Hannister &

Co.

Hdw., cs, 1

Gain Robert.

Hdw., cs, 15

Graf Cutlery Co.

Bells, 1200

Hoag F. & G.

Whetstones, doz, 180

Hartley & Graham.

Mdse, pkgs, 5

Hensel, Bruckmann &

Lorbacher.

Iron mach., cs, 4

Isaacs & Yought.

Hdw., cs, 1

Kline, Briggs & Co.

Grass hooks, cs, 1

Krause & Hahn.

Whetstones, cs, 155

Levy E.

Hdw., cs, 1

Lewis & Conger.

Hdw., cs, 9

Lockwood A. J.

Anvil, 1

Fles, cs, 2

Lower C. F.

Hdw., cs, 1

Mason J. W. & Co.

Wire rope, coils, 9

McAndrew J. C.

Emery stone, tons, 118

McCoy & Co.

Mdse, pkgs, 10

Iron rails, bags, 40

Hdw., cs, 2

Merchants Dispatch Co.

Gun wads, cs, 14

Mitchell, Vance & Co.

Mdse, pkgs, 6

Moore's J. P. Sons.

Gun wads, cs, 14

National Steamship Co.

Lamarche H.

Zinc, cs, 150

Merchants Dispatch Co.

Nickel silver, cs, 1

Copper bars, 911

Copper bars, bxs, 3

Nevada Bank.

Tin plates, bxs, 542

Tin plates, bxs, 7709

Reg. anty, cs, 55

Pratt Chas. & Co.

Tin plates, bxs, 550

Wheeler E. S. & Co.

Tin plates, bxs, 1250

Wilson J. W. & Co.

Metal cornices, cs, 1

Order.

Antimony, cs, 84

Black plates, bxs, 15

Nickel, pkgs, 4

Old brass, pkgs, 12

Old cop., pkgs, 3

Old metal, pkgs, 2

Spelter plates, 542

Tin andterne plates

bxs, 218

Tin plates, bxs, 42,329

Tin slabs, 2307

Zinc, plates, 4049

PHILADELPHIA.

Office of The Iron Age, 220 South Fourth St.,
PHILADELPHIA, May 4, 1880.

Pig Iron.—The course of the market is

still downward, and all descriptions may be

quoted materially lower than at date of our

last report. The best brands of Mill Irons

have been marked down to \$25 per ton at

furnace, which represents a decline of \$5

per ton in four weeks, but other descriptions

may be considered \$5 to \$8 per ton lower

within the same period. The best Foundry

Iron is probably \$5 to \$6 lower in the same

time, but supplies are not excessive, and the

weakness appears to be entirely due to the

large quantities of foreign iron which are

being forced on the market. The decline

here in foreign iron within the past month

is probably \$7 to \$8 per ton, but on the

other side of the ocean, \$2.50 to \$3 seems

to be the full extent of the decline.

From this it may be inferred that foreign

markets are relatively in a steadier position

than our own, and that having

got rid of their surplus stocks, prices are

not likely to yield much further, and with

a slight improvement in the demand

from other sources another upward move-

ment may be inaugurated. Neither is it

likely that iron purchased on American ac-

count will be shipped to this country under

present circumstances. The decline here

being relatively much greater than in Eng-

land, it is likely that resales would be made

at a loss of \$2 or \$3 per ton in preference

to shipping and selling at a still greater

loss. For these reasons, therefore, it is prob-

able that shipments to this country will be

very light hereafter, and the amount of foreign

iron to be dealt with is fairly understood.

The quantity here and abroad, however,

is sufficient to check all idea of an advance

for the present, and it is not unlikely that

prices may settle down to a lower range than

current at this date. All that trade needs is

a fixed basis of values, which, when once

fairly established, would, it is believed, lead

to greater activity than has yet been realized.

The heavy decline has not brought

with it serious disaster to any legitimate

branch of business, for the reason that no

orders of any amount were given out at the

high prices. Consumers have been running

on material purchased before the advance, and

in lowering prices to meet the market they do

so under the most favorable conditions. Fur-

naces recently started on high-priced ores,

and with no established trade for their output,

are exceptions, and most of these will prob-

ably suffer severely, but in all departments

the great majority will escape without any

material loss. There is a strong desire to

get down to the bottom, and whatever re-

duction is needed to place business on a solid

foundation, all classes appear willing to

we are told, matters are now duller than ever. I throw no doubt upon the veracity of those who take this view, but I am bound to state that my own information is far more favorable. The principal cutlery houses, for instance, are all well engaged—indeed (as I have repeatedly stated) several of them have more work in hand than they can well get through. The small men may, perhaps, be badly off—a remark which applies to the electroplate and edge tool makers. The fact seems to be that Sheffield is too liberally supplied with "little masters"—men with little or no education and a minimum of capital. These men make and sell from hand to mouth in the most literal acceptance of the phrase. They are, therefore, early "down on their luck" when the pinch comes, and make very little hay when the sun shines. Probably they will gradually disappear and be displaced by extensions of the factory system. The men in the file trade have been given an advance of 10 per cent., which, we may assume, would not have been granted had not the industry been fairly prosperous.

SHEFFIELD EXPORTS TO THE UNITED STATES.

Several times within the past few months statements have appeared in various journals purporting to give, in a fragmentary and disjointed sort of way, certain statistics touching the quantities and values of Sheffield exports to the United States. One of these statements I embodied in a recent letter. In the *Manchester Guardian* of today I find a long piece of "lineage" which is ostensibly devoted to "the revival of the Sheffield trade with America" during the first quarter of 1880, but which is really occupied with matters relating to portions of 1879 and 1878. The statistics are said to be "officially" obtained, and the context shows that the figures have been furnished by the American Consul at Sheffield, Dr. Webster. I have been at some trouble in fishing out the appended particulars, which are, you will observe, still incomplete in point of the totals for the March months and quarters:

JANUARY.			
	1880.	1879.	
Steel.....	\$20,080	\$11,361	
Bessemer rails.....	20,000	17,199	
Cutlery.....	17,199	17,199	
Edge tools.....	630	790	
Sheepshears.....	1,109	1,242	
Sundries.....	12,545	5,775	
Total.....	\$80,573	\$36,474	
FEBRUARY.			
Steel.....	\$28,407	\$12,177	
Rails.....	4,885	13,343	
Cutlery.....	18,996	13,343	
Edge tools.....	862	805	
Sheepshears.....	1,078	805	
Sundries.....	14,621	6,965	
Total.....	\$68,849	\$33,995	
MARCH.			
Steel.....	\$40,018	\$12,184	
Rails.....	7,000	11,716	
Cutlery.....	30,153	11,716	

AT BIRMINGHAM

there have been no new movements of importance as regards finished iron. Marked brands are still nominally $\frac{1}{2}$ ton, but underselling to the extent of $\frac{1}{2}$ @ 10/ ton is in vogue. An American inquiry for 3000 tons of finished iron of sundry sorts is reported to be in circulation, with a probability of its being placed in Shropshire. Producers, as a rule, are steady in their quotations, and profess their perfect confidence in the early future. The home market for odd ironwork and general hardware is improving, a better tone having supervened in many places since the end of the elections. The farmers, too, are plucking up a little more courage, by reason of the magnificent weather with which we have been favored up to now this season. For cheap side-snap guns, American orders are tolerably numerous. One house is understood to have booked an order last week for 800 such birding guns, and to have orders from your side for 4000 now on its books. The price is reported to be about 35/ @ 37/ each, the whole of the "fixings" being machine made. The metal rollers, copper tube, wire, &c., manufacturers met on Thursday last and reduced prices $\frac{1}{4}$ d. lb, making brass wire to No. 20, $\frac{3}{4}$ d.; copper wire ditto, $\frac{1}{4}$ d.; and copper telegraph wire, $\frac{1}{4}$ d. lb.

BIRMINGHAM EXPORTS TO THE UNITED STATES.

Mr. J. Francis Brame, U. S. Consul at Birmingham, has compiled a statement of the business transacted with the United States in the district of his consulate during the quarter ending March 31, 1880, which he compares with the same portion of 1879. He states that the greater part of the increase under the heading of hardware has been owing to the large exportations of iron of different descriptions. The figures are as under:

Quarter ending—			
	March 31, 1880.	March 31, 1879.	
Anvils and vices.....	5,908 18 2	2,751 0 0	
Buttons, shell and needles.....	32,952 2 7	16,550 5 5	
Boot materials.....	1,735 14 2	2,372 10 7	
Chains, hose & scutches.....	7,042 15 7	1,750 4 7	
Chemicals and phosphorus.....	8,224 8 1	2,003 6 0	
Fancy goods & jewelry.....	16,899 5 0	13,057 14 7	
Glass, porcelain, &c.....	4,641 8 9	712 12 0	
Guns and materials.....	33,222 15 1	19,333 14 6	
Hdw., cutlery, steel and iron.....	117,316 7 2	11,004 12 4	
Metal for sheathing.....	9,777 17 4	45 1 9	
Nickel and cobalt.....	1,063 3 10	81 5 0	
Pens and tips.....	7,371 17 10	5,632 1 2	
Saddlery and skins.....	4,717 10 1	1,594 12 5	
Sundries.....	8,350 2 10	8,349 16 1	
Total for Bir'mham.....	\$251,319 5 8	\$84,278 16 3	

Gas-Fired Boilers.—The Germans appear to be making rapid progress in applying gas firing to steam boilers. Herr G. Liegel, of Stralsund, announces, in a recent issue of the *Verh. d. Ver. z. Befördr. d. Gewerbfleisses*, that by a system developed by him he has obtained very favorable results. During an experiment lasting 72 hours, he evaporated in a boiler having a heating surface of 27.1 square feet, 9766 pounds of water, having an average temperature of 62 degrees. In order to do this he used 105.5 pounds of coke. Taking into account that 164 pounds of ashes were left behind, it will be seen that 894 pounds of carbon were actually used, so that 10.92 pounds of water were evaporated for every pound of carbon, which, if the hydrogen in the coal, 0.56 per cent., be taken into account, would yield a useful effect of 82.35 per cent.

SCIENTIFIC AND TECHNICAL.

Nature gives a translation of Raoul Pictet's PROPOSAL TO DISSOCIATE METALLOID ELEMENTS.

from which it appears that his plan is to build an enormous parabolic mirror, in the focus of which the sun's rays should be concentrated upon the various metalloids which it is sought to decompose. All the data for calculating the requisite size of mirror are known to a certain approximate value, with one exception. We know the quantitative intensity of solar radiation, and the reflecting power of polished metals, and hence can calculate how many units of heat a mirror of given size will hurl into its focus per minute. We do not know how much heat must be furnished to a given weight of any one of the hitherto undecomposed metalloids to dissociate it, but we are quite certain that this quantity must be much greater than that produced by the combustion of an equal weight of hydrogen and oxygen. Assuming that to dissociate bromine required a hundred times as much heat (at the temperature of its dissociation-point) as water vapor requires (at its dissociation-point) to split it up, M. Pictet calculates that a single gram of bromine must have 350 calories expended upon it to resolve it into its elements. Further calculation leads him to consider that to dissociate one gram of bromine per minute, would require that the solar rays should be concentrated by a mirror of at least 35 square meters of surface, measured normally to the rays, or of about ten meters' aperture. It would, he thinks, be best constructed in separate pieces of about a square meter in area, each ground and polished to a true curve and mounted in a special frame. The depth of the mirror should be equal to half its aperture, bringing the focus into the plane of the rim. At the focus would be a special solar chamber, or crucible, constructed of lime or zircon, or other refractory substance, into which the vapors to be operated upon would be led. To avoid loss of heat it would be kept hot from without by oxyhydrogen flames. The whole apparatus ought not, he thinks, to weigh as much as two tons. To catch and retain the dissociated substances, and to prevent their immediate recombination, he proposes to aspirate the vapors of the chamber through metal tubes containing metallic gauze, and cooled from without to a temperature perhaps as low as 50° by intense artificial refrigeration. The rapid cooling thus produced should hinder at least a considerable proportion of the constituents from recombining as fast as they were liberated from each other in the solar chamber. Dr. Siemens, who recently exhibited the effect of the electric light upon the growth of vegetation, has shown

the fruit being exposed to the sun by day and the electric light at night. The contrast between two pots of strawberries is very striking; the fruit being quite ripe in the case of the plant which has had continuous light, and still green in that which has had only the sunlight. It seems clear that the enterprising gardener will some day call in the aid of the electric light to obtain an early crop.

A strong movement appears to be on foot in England to introduce PHOSPHORESCENT PAINT for a variety of practical purposes. The subject, which has been attracting some attention for the last year, both in this country and abroad, has been very lucidly and elaborately treated, in a paper read by Prof. C. W. Heaton, before the Society of Arts. The history of discovery in regard to phosphorescence is a somewhat lengthy one. Obscure hints of the phosphorescent power of gems are contained in some of the works of the ancients, but nothing definite was discovered until about the year 1602, when a shoemaker of Bologna picked up a heavy stone, and being an enthusiastic alchemist, took it home and treated it in his furnace, in the hope of obtaining gold from it. Instead of getting gold he obtained a mass which shone in the dark, and which became celebrated as the Bologna stone, or Bologna phosphorus. The stone was the now well-known heavy spar, and acted on by carbon, it yielded barium sulphide, a compound of considerable phosphorescent power. In 1761 came the discovery by Canton of the phosphorus or pyrophorus, which bears his name. It is made by calcining oyster shells with sulphur, and consists, of course, essentially of calcium sulphide, which is the most remarkable of phosphorescent substances. In 1775 Wilson published some valuable discoveries. He extended the list of phosphori, showed that light of various colors could be obtained from them, and made some interesting observations on the effects of heat and cold. Passing on, we come to Edmond Becquerel, who invented an instrument by which he was able to detect the phosphorescent power in bodies which remain luminous for very short periods of time. Of all phosphorescent bodies, the sulphides of calcium, barium and strontium are the most remarkable in regard to the duration of their light; and Becquerel has studied the modes of preparing these compounds with the greatest care, and has revealed many strange and even startling facts in regard to them. They can be prepared by the action of carbon on the sulphates, by the action of sulphur on the oxides and carbonates, and by the action of alkaline sulphides, and even of antimony sulphide, on the last-named compounds. The phosphori prepared by these various processes differ widely in regard to the color and duration of the light which they emit, and it is even possible to obtain shades varying from orange-red and indigo-blue from calcium only. But this is not all. The calcium sulphide obtained from calcite is different from that from aragonite, though these minerals have the same chemical composition, and the differences remain even after each mineral has been dissolved in acid, reprecipitated by sodium carbonate and then ignited with sulphur. This affords a strange and, for the present, inexplicable example of molecular persistency. The late Mr. Balmain, late of University College, an excellent chemist, succeeded in producing a constant and very powerful phosphorescent substance which, mixed with water or oil,

is used as a paint in the ordinary manner. In order to show the sensitiveness of the paint, a sheet of painted card, previously kept in darkness, was exposed to Leyden jar sparks from an induction coil, and each spark impressed its image on the card, making it luminous. The phosphorescent light is considerably affected by temperature, so that a can of hot water placed on a faintly luminous pane, being removed after a minute, shows the light in that place to be brighter than it was before. A very short exposure to artificial or to sunlight produces the maximum of illumination, though, of course, the amount of this illumination depends on the quantity and quality of the light. The duration of the light is likewise dependent to some extent on conditions. When the paint has been exposed to the intense light of the sun or of burning magnesium, a good deal of the brilliancy disappears quickly, but after that the fading is very slow, and it may be said that a more or less useful light will remain through the length of an ordinary winter's night. In an extreme case it was possible to see the dial of a watch by the light emitted from a card which had been in total darkness for 26 hours. The most important application of Balmain's luminous paint are to the lighting of railway cars while passing through tunnels, the illumination of fiery coal mines, the coating of divers' dresses with the paint, and the illumination of life buoys.

Mr. D. W. Bradley, in a paper read before the Polytechnic Club of this city, gives interesting historical data and some details

ON THE PNEUMATIC TRANSMISSION OF TIME, a subject which is attracting much attention in Vienna and Paris, and in San Francisco. About 15 years since Mr. Bradley received an invitation to witness some experiments for transmitting signals on shipboard by means of pulsations of air through small tubes, his advice being sought in regard to the use of the system for transmitting time. While he was not favorably impressed by the trials, it seems that the same subject attracted the attention of Herr Mayrhofer, of Vienna, who, after experimenting for a number of years, finally obtained permission to put up a series of clocks in Vienna. In the meantime, Mr. Hermann T. Wenzel, of San Francisco, made a trip to Europe, and on his return in 1873 he obtained letters patent for a mechanism for producing time pulsations. According to his specification, the main parts of his mechanism consist of a cylinder or vessel, raised or lowered periodically by clockwork into and out of a liquid contained in a vessel, in combination with the tube connecting with a distant vessel. In the latter is a float, actuating the mechanism of a dial in union with the main clock mechanism. His apparatus was exhibited in this city, and was introduced into a number of large buildings in San Francisco. In May, 1879, however, the Patent Office granted Herr Mayrhofer a patent, a step which is severely criticised by Mr. Bradley, who states that the following are the only points of difference between the two systems. Wenzel uses two jars, one standing partially filled, preferably with glycerine, from the center of which an air tube, with its opening just above the fluid, runs to its destination. The other jar is smaller, and is suspended inside the first with its mouth downward, so as just to clear the fluid. At the proper moment for the impulse, the second jar is forced down into the glycerine, and the imprisoned air rushes through the tube to the secondary clock, where it meets with a similar device, except that the jar is already immersed in the glycerine. This jar is forced upward by the incoming air, and thus operates a ratchet and pivot, which move forward the hands of the clock one minute. The impulse is given by a cam or its equivalent, which takes a run at regular intervals on being released by a primary clock. When the primary jar is released, it is lifted up and out of the fluid by means of a lever and balance, whereupon the second jar drops down into its normal position in the fluid. Mayrhofer uses a cylinder and piston in place of the jars and fluid, and while Wenzel proposes to operate his secondary dials in large buildings, hotels, &c., by a large primary clock in each, his Austrian rival intends to work on a large scale with mains and service pipes leading through the streets, and having connections with each building in the same manner as gas and water. The secondary dial works are precisely the same as those used in secondary electric clocks. Mayrhofer used at one time a small bellows that, by expanding, lifted a gravity arm, and by contracting carried forward the hands.

Some years since, Mr. Gustav Bischof drew attention to the remarkable properties of IRON SPONGE FOR FILTERING WATER, and though fully borne out by careful examinations, the matter did not assume any practical shape until quite recently. According to *Engineering*, iron sponge is to be employed as a filtering material by Messrs. Easton and Anderson for the filters at the Antwerp Water Works. To determine the suitability of the spongy iron for effectually dealing with the Neth water, which is to be used for the supply of Antwerp, Messrs. Easton and Anderson have recently carried out a series of experiments on a considerable scale, and these have yielded results of much interest. The arrangement employed consisted of two cast-iron tanks, each having a horizontal area of 342 square feet, while the one was about 11 feet and the other 7½ feet in depth. In the larger tank there was placed, on a suitably constructed brick bottom, a depth of 3 feet of spongy iron and gravel, mixed in the proportion of 1 to 3, while above this was placed a bed of Harwich sand 18 inches in thickness. From the bottom of this filtering tank the water was drawn off to the second tank, this latter containing, as filtering material, a bed of gravel about a foot thick, with 2 feet of Harwich sand above. The object of the second filter is as follows: In passing through the spongy iron a small quantity of iron is dissolved in the form of protoxide, and if not removed it would, when converted into peroxide by the contact of the water with the air, be thrown down in the form of a brownish deposit. In the spongy iron filters for domestic use the further oxidation of the protoxide is effected by an admixture of binoxide of manganese,

the peroxide of iron being thus formed and retained in the filtering material. This use of binoxide of manganese would not be convenient on a large scale, and in the arrangement we are describing, the water, after passing through the spongy iron in the first tank, is allowed to come in contact with the air in the second tank, when the peroxide of iron is thrown down and arrested by the filtering material which that tank contains, thus allowing the water to be delivered perfectly clear. With this arrangement, Messrs. Easton and Anderson found that they could efficiently filter the Neth water at the rate of 150 gallons per square foot of filtering surface per 24 hours, or 6¼ gallons per square foot per hour. At the Metropolitan Water Works the rate of filtration with the ordinary filter beds varies from about 1½ gallons per square foot per hour in the case of the East London and the West Middlesex works, to as much as four gallons in the case of the Lambeth Works; but the average rate for all the works is decidedly under two gallons per square foot per hour, so that the results which Messrs. Easton and Anderson have obtained with spongy iron, and with a water greatly in need of filtration, point to the possibility of employing filter beds very materially smaller than those ordinarily necessary. So far as experience at present goes, the spongy iron in filters requires no renewal. Its action appears to be to produce an oxidation of the organic matters in the waters traversing it, the result being a discharge, from time to time, of carbonic acid.

At a recent meeting of the Paris Academy, M. Paul Bert described a

TELEMICROPHONE.

which transmits speech well, though spoken to at some little distance. In it two important modifications of the ordinary apparatus are introduced. The first consists in the substitution of a comparatively thick plate of hardened rubber for the thin membrane commonly employed; the other is a new way of regulating the carbons of the microphone. The fixed carbon passes through the plate; the other is carried by a small pivoted rod of iron, the mobility of which depends on the position given to a small magnet, which forms part of the mechanism. The author recommends the simplicity and precision of this mode of regulation as much preferable to the various kinds of springs hitherto proposed. It need hardly be added that the variations of current produced by the vibrations are transmitted to a suitable receiver. The disturbing microphonic sounds are avoided in the new instrument, and the voice, far from having the disagreeable timbre of most telephones, is hardly altered. Speaking (pretty loudly) at a distance of even four or five meters from the vibrating plate there is perfect transmission.

Verona Spring Washer.

We illustrate below a new washer that Metcalf, Paul & Co., of the Verona Tool Works, Pittsburgh, are just placing upon the market. This is a spring washer made of cast steel, on the same principle and with the same care as their Verona Nut Lock, of



VERONA SPRING WASHER.

which many millions are now in use. The washer is especially designed for use where, from constant jarring, ordinary washers and nuts work loose. It is also designed for use where, from the natural shrinkage of wood, nuts also are likely to work loose. For machinery, agricultural implements, locomotive cars and wagons they will be especially valuable. We refer our readers to their advertisement on another page for list of sizes, and to our trade report for prices.

Machine Saw Classification.

Mr. Robert Grimshaw, Ph. D., contributes the following on the classification of saws, to the *Cincinnati Artisan*:

We may class all saws and sawing machines primarily into (I) Alternating or reciprocating, and (II) Continuous acting.

In the first class we find—

- (A) Rectilinear.
 - (a) Cylindrical segment.
 - (b) Chain.
 - (a) Convex cutting.
 - (b) Concave cutting.

In the second we have—

- (A) Band, belt or ribbon.
 - (a) Solid teeth.
 - (b) Inserted teeth.

- (B) Circular.
 - (a) Cylindrical, tub or tube.
 - (b) Spiral.

- (E) Chain.
 - (a) Convex cutting.
 - (b) Concave cutting.

The reciprocating rectilinear saw is divided into strained and unstrained. The strained division comprises those strained (a) in a frame, gate or sash (b) by a spring; (c) by a weight. The frame, gate or sash may have a blade (1) guided at both ends; (2) guided at one end; (3) unguided. Those guided at both ends have either rigid or elastic frames. In the former class we have the blade either overhanging or contained in the frame; and in the latter subdivision we have either one blade, as in the single-sash mill, or many as in the gang-sash mill. We shall at present confine our attention to the "single sash."

THE SINGLE SASH SAW MILL.

The earliest type of saw mill was the "frame," "gate," or "sash" machine, having a single blade strained in a vertical sash or tension frame surrounding the log. This type is about the same all over America; perhaps all over the world. As first made, the tension frames were of wood; having the disadvantage of great weight without proportionate strength; and, also, of being unsuited to some climates. Later they were made of solid bars of soft iron. They should be of steel and with hollow sections.

The framing* of the whole device is most frequently of wood, got out and set up on the site by millwrights.

More recently the framing has been made of cast iron, "self-contained," and ready for setting up with little difficulty by an intelligent mechanic, and not necessarily by a specialist in sawing machinery.

The wood-framed sash machines are frequently found throughout America in connection with a grist mill, both being primitive necessities. The log is usually mounted on a carriage, or on a set of trucks (log seats), and held by chains or by "dogs," there being the widest diversity in form and operation among these latter. Where, instead of a series of trucks placed at variable distances, according to the length of the log to be sawed, there is a carriage of definite length, this last may be mounted on wheels running on iron or wooden tracks, or the rails may be upon the under side of the framing and run upon rollers placed in line below.

The feed may be given:

1. By the sawyer or assistant pushing the log and trucks through.
2. By a corrugated roller below the log.
3. By two sets of feed rollers on opposite sides.

4. By a rope or chain automatically wound up.

5. By a pinion gearing into a rack on the carriage.

6. By an "endless apron" of chains on which the log or cant rests.

In the five latter cases the feed should be intermittent like that in a sewing machine, and on the up stroke of a sash, in the case of blades cutting on the down stroke only. The intermittent feed is given by ratchet wheel and pawl, or by a friction segment and grooved wheel. The single-sash machine has the disadvantages of reciprocating motion, generally cutting on one stroke only, and hence giving a limited number of feet of cutting edge per minute (say 400 to 500 feet). The inertia and shock of reversing the stroke causes vibrations, requiring increased power to run it; and also lessening the regularity and smoothness of surface of lumber cut. The power required to drive the reciprocating parts and overcome the friction of the machine, is large compared with the work done in cutting with a single blade. The carriage has to be reversed more frequently than when several blades are working in the log at a time; this is a loss of power and time, and limits the capacity of the mill.

A single-blade sash machine often takes up even more room than a gang. The frame limits the size of log to be taken in; or, what is in effect the same thing, it requires a frame more than twice the width of the largest log to be sawed.

This great width of frame is a disadvantage. For logs 36 inches in diameter, first cut to be 3 inches, there must be a clearance of 3 inches at side; so where the saw is hung in the middle, the frame must be 6 feet wide in the clear. In a gang sash, with the same side clearance, the frame need be only 42 inches wide in the clear for the same-sized log.

One of the principal difficulties is to get the lower girt, or "cross-piece," of the frame stiff enough to stand the pull of the pitman and the lift. This last often takes more power than the pull; and yet, while the pull has both girts to resist it, as the saw blade binds the upper and lower girt together, on the lift only the lower girt acts, and the springing up and down buckles and loosens the blade.

There are cases where the machine is inverted, the fly-wheels and crank shafts being overhead and little excavation being required. Some of these machines, such as those built by Thomas Robinson & Son, Rockdale, Eng., are self-contained with iron framing. Others—as F. Arbey's, of Paris—have wood framing and are bolted to overhead beams.

The next class of mill is the vertical, overhang saw—a development of the single sash, and in which the blade is strained by a T-shaped frame. It is sometimes a "forest mill," but has special advantages in sawing valuable woods, as mahogany, where the log has to be examined after each cut. The log may be dogged from the ends, or, where very thin stuff is desired, from the sides, being held up against a stiff, vertical fence, forming part of the carriage.

There are two kinds of horizontal reciprocating sawing machines with strained blades—

1. Cutting in the vertical plane and having vertical bed.

2. Cutting in the horizontal plane and having horizontal carriage.

Of the first class we may mention Robinson's and Arbey's veneer machine; the block being dogged or glued to a vertical traveling bed, having a vertical feed motion, and the cut being made as the carriage and block rise.

In the second class comes one of Robinson's machines, in which the log remains at a constant level, and the "set" is given the sash; the counter shaft having vertical adjustments to follow the downward motion of the sash and guides.

This last has a double cutting blade, having "lead" on each stroke.

As the single-sash machine cuts only 2000 to 4000 superficial feet per day, and as the requirements are for one that will make at least 10,000, and preferably double that quantity, the single sash is falling out of use, save in extremely remote districts—its place being supplied by the muley, the gang sash or the circular.

President Diaz has granted a concession to Robert R. Symon, who represents a Boston company, for the construction of a railway to Leon, with one branch to the Pacific coast and another to the Rio Grande. The concession is made subject to the approval of Congress.

The French Cable Company have reduced their tariff to Great Britain, Ireland and France to 50 cents per word.

* In this article the word "frame," when used, generally means the saw sash, gate or tension frame, the word "framing" being applied to the timbers or other framework of the machine and mill.


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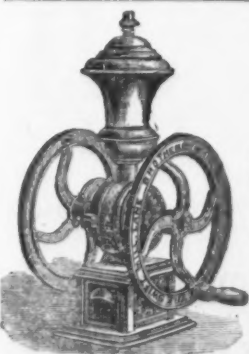
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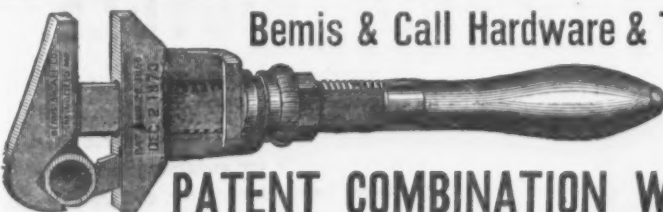


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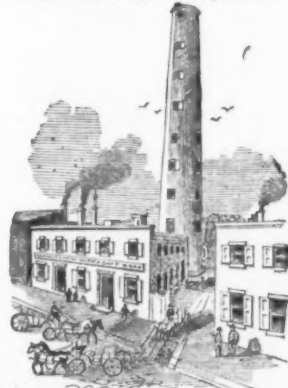
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Threatened Derangement of Trade with Japan.

We have been favored by a South street firm in the Japanese and China trade with the following official correspondence, not before made public, bearing on important interests. The threatened imposition of a 20 per cent. import duty by the government of Japan upon the refined products of petroleum from the United States, is regarded by New York merchants as a serious matter, demanding the attention of the authorities at Washington. Kerosene being the main staple relied upon to exchange for some 34,000,000 pounds per annum of Japanese teas consumed in this country, a check upon this trade would be equivalent to a demand upon the United States of gold equal to almost the entire value of the teas received from that quarter:

YOKOHAMA, JAPAN, Aug. 11, 1879.

Hon. Judge Bingham, U. S. Minister to Japan.—DEAR SIR: Referring to our interview in June last on the subject of petroleum, and in accord with suggestion then made that I should embody my views in written form, I respectfully submit the following for your consideration:

The United States practically and commercially monopolize the production and manufacture of this important staple, which has found its way into nearly every corner of the civilized and uncivilized world, and its rapid development and extensive export the past few years has been a prominent element in readjusting general trade balance in favor of the United States. In 1878, about 2,000,000 cases were shipped from New York and Philadelphia for Japanese consumption, representing in value, if I am correctly advised, fully three-fourths of the entire United States export for Japan, and being the only single article which materially serves to lessen the "balance of trade" so largely at present in favor of Japan. That the foothold secured here for this staple should be permanent becomes, therefore, a matter of some national importance, and any unreasonable restriction or legislation contemplating its prohibition should encounter, in my judgment, the determined opposition of our diplomatic representatives; and I cannot, therefore, refrain from expressing my gratification at the interest you exhibited in the premises, giving full indication that you do not allow political and diplomatic avocations to outweigh commercial considerations.

I note at present but two contingencies likely to jeopardize the permanency of this business, viz.:

Excessive Import Duty.—In this connection I fully concur in the inherent right of Japan to regulate her own tariff, and fail to see how any nation, least of all our own, can dissent therefrom. I realize the probability that she will soon secure this right, and that an increased duty on petroleum will receive early consideration thereafter. The extent of duty on any article should naturally depend upon whether it is to be imposed for purposes of revenue or protection; whether the article is a luxury or a necessity, and somewhat on the reciprocal policy adopted by other treaty powers. The Japanese government cannot consistently enforce a high duty on the ground of protecting a home interest.

I have given the subject of Japanese production considerable attention since seeing you, including a visit to the oil wells and to one of the principal refineries, and I am positive no one conversant with the subject will contend that there is anything whatever in this production, present or prospective, warranting government investment or protection. Quantity, quality and cost forming a trinity of arguments against its recognition.

Prohibitive Test Requirements.—If petroleum were an experiment instead of a result, the agitation of this question might be reasonable; at this late day any action would be unnecessary and unwarranted. No one can possibly have the great interest in the continued excellence of this article that the American refiners have. All that science, enterprise and capital can accomplish has been, is being, and will continue to be, done. Upon its permanent safety as an illuminant, and the confidence of the world in this safety, must depend immense investments in machinery, aggregating many millions of dollars and valueless for any other purpose, and the result has certainly vindicated the efforts and the expenditures involved. In every part of the world petroleum is being regularly and safely used by the old and young, the careful and the careless, and, I might almost add, the sober and drunk of both sexes, and the rarity of accidents resulting is extraordinary evidence of its quality and safety. It is manufactured to burn and not to be "fire-proof," and any legislation incited by ignorance or prejudice that should impose impracticable tests or conditions upon its entry here, would only conflict with the desires of the consumers, the revenue of the government and the legitimate rights and incomes of the commercial community, and so far as I can see, could result in good to no human being.

I recall with satisfaction the willingness you expressed to advise the State Department at Washington of any contemplated action adversely affecting petroleum interests in Japan, with the recommendation that opportunity be afforded the prominent refiners to communicate their views and suggestions in the premises to you through the same medium. A notification to either of the following firms or corporations would elicit a response, giving expression to the Devoe Manufacturing Co., Messrs. Chas. Pratt & Co., J. A. Bostwick & Co., the Sone & Fleming Refinery Co., of New York; Messrs. Warden, Frew & Co., of Philadelphia, or the Standard Oil Co., of Cleveland, Ohio.

I close the communication by saying that, while the views expressed herein and during our interview are individual only, I have no reason to assume that they do not coincide with the views of the American refiners, for whom I am at least competent to speak, to the extent of expressing in advance their high appreciation of any efforts you may make to further the permanency of this important American interest in Japan, or to

guard it from hasty or unreasonable legislation. Believe me, dear sir, with high personal respect, faithfully yours,

WETMORE, CRYDER & CO.,
73 & 74 South Street,
New York, Jan. 22, 1880.

Hon. William M. Evarts, Secretary of State, Washington, D. C.—SIR: By the last mail from Japan our friends inform us that the Japanese government propose very radical changes in the duties on imports into that country, the most important of which is on kerosene oil. The present rate on this article is 5 per cent. duty on the New York invoice cost at the date of export, and it is proposed to levy a duty of 20 per cent. instead, to be assessed upon the cost at place of export in the United States, adding thereto the cost of freight, insurance and commission, which upon the present value of this article would be equivalent to a duty of about 32 cents per case or 30 per cent. ad valorem, against the present duty of about 6 cents per case or 5 per cent. ad valorem. The Chinese duty is only 5 per cent. ad valorem.

When the commerce between Japan and the United States is taken into consideration, we find that the only article of export from this country which meets any considerable demand in Japan is kerosene oil, the export of which, commencing in 1872, 26,000 cases; 1873, 57,344 cases; 1874, 108,737 cases; 1875, 335,800 cases; 1876, 90,123 cases; 1877, 556,549 cases; 1878, 1,759,422 cases; 1879, 1,735,923 cases. Cases of 10 gallons each.

England supplies all the cotton manufactures required, leaving kerosene oil really the only article of any magnitude taken from this country, on which it is proposed to impose so prohibitive a duty. On the other hand, we are the only customers for Japan teas, as they are not liked in other countries, and our annual import of these kinds, as distinguished from China teas, amounts to 25,000,000 to 30,000,000 of pounds. This year (May 1879 to May 1880) our receipts will aggregate 35,000,000 pounds, all of which is admitted here free of duty, as is the case with raw silk, also free of duty.

We simply desire to submit these facts to the attention of the Department of State, and to state that we are very largely interested in the trade with Japan, both as exporters and importers, and to add our remonstrance against the imposition of the proposed duty upon kerosene oil, as inconsistent with the prosecution of the trade under such a tariff.

We beg to express the hope that the most urgent objection will be made by your department against the adoption of the said duty on kerosene oil, as evidencing an entire want of reciprocity in the first place, and resulting in a diminution of the hitherto increasing business in this great American production.

We also beg to call your attention to the fact that the proposed tariff only imposes about a 10 per cent. duty on English manufactures or products, which is a flagrant discrimination against this country. If the United States should impose a duty on Japan teas and silk, and admit the China product free, the discrimination would no doubt be as objectionable to them as their new tariff would be to us, if adopted.

All of which is respectfully submitted. And we have the honor to remain your obedient servants.

DEPARTMENT OF STATE,
WASHINGTON, February 24, 1880.

Messrs. Wetmore Cryder & Co., 73 and 74 South Street, New York City.—GENTLEMEN: I have the pleasure to acknowledge the receipt of your letter of the 22nd ultimo, representing that in the proposed revision of tariff in Japan it is contemplated to place an excessive duty of 20 per cent. ad valorem upon petroleum, a staple export of the United States, while the staple exports of Great Britain and other countries are taxed only about 10 per cent.

Your statements substantially present the issue of the matter in the same light in which it has been set by the dispatches and reports of the United States Minister to Japan. An instruction has been sent to Mr. Bingham, accompanied by a copy of your letter for his information, directing him to make such urgent representations to the Japanese government as may equalize, in a just manner, the duties on the staple products of different countries, and so avoid the unfair, inexplicable discrimination which seems to be contemplated. I am, gentlemen, your obedient servant,

(Signed) WM. M. EVARTS.

YOKOHAMA, March 8, 1880.

Gen. Thomas B. Van Buren, Consul General of the United States, Kanagawa.—DEAR SIR: In accordance with your request, we now beg to give you our views regarding the effect of the proposed change in the tariff upon the trade between this country and the United States, with special reference to the trade in kerosene oil, which is the only considerable import from America.

We consider the proposed duty of five sen per gallon excessive, and alike disadvantageous to the United States and Japan. Excessive because no pretense is made that a prohibitive duty is desired, while for a purpose of revenue it would defeat its object; and lastly, for the reason that no ground exists for a protective duty.

We assume that there is no wish on the part of the Japanese government to impose a prohibitive duty, and we think it will only be necessary to compare the shipments of kerosene oil from the United States to Japan during the few years in which it has been sent here, to show how dependent the trade is upon the cost of the oil, and, consequently, how seriously the revenue is likely to be affected by the imposition of so high a duty as five sen per gallon, which is fully 50 per cent. of the prime cost in New York last summer.

Kerosene was first imported from the United States in 1872, when 26,000 cases were shipped. The trade rapidly increased until 1875, when the shipments reached the sum of 335,800 cases—the average price during this year at port of shipment being 18 cents per gallon.

In 1876 the price in New York rose to 32 cents per gallon and shipments fell off to 90,123 cases, a reduction brought about solely

by the increased cost, and not due to excessive shipments in 1875, as in the following year. When the price declined to its former level, the export rose to 556,549 cases. This is further shown by the course of the market in Yokohama. In 1876, when the prices here rose to over \$4 per case, the shipments were but 90,123 cases, as mentioned above; whereas in 1879 they amounted to 1,735,923 cases, the price meantime having declined to less than \$2 per case in Nagasaki and Kobe, and in Yokohama having fallen to \$1.75. Conversations with prominent native dealers confirm this view of the case, for they maintain that the consumption of kerosene in the country districts varies in the proportion of three to ten, according to the price at which it can be bought. For a protective duty we think there is no ground, as we have it upon the highest authority that the deposits of rock oil in these islands are very small, and the cost of working them entirely disproportionate with the results obtained.

From the geological survey of Japan, published by the Public Works Department, Tokio—Reports of Progress for 1878 and 1879—we have taken the following figures. The sho being .4792 of a United States liquid gallon:

The number of oil wells in all Japan, productive, was in 1876, 636 wells; the total daily yield 2323.8 sho, and the average daily yield, 3.05 sho.

In 1877 it was 41 wells; total daily yield, 629 sho, and average, 15.311 sho.

In 1878, 286 wells; total daily yield, 6485.90 sho, and average, 23.98.

In 1879, 5 wells; with an average daily yield of 26 sho, and a total of 229 sho.

From these statistics it appears that the present production of oil is practically nothing, and that even in 1878, when the production was greatest, only 3080 gallons were daily yielded, which would hardly meet the daily wants of a small city.

It needs scarcely to be mentioned that it is to the disadvantage of the United States to have Japan close her ports, as it were, to the only staple which can be sent in any considerable quantity as part payment for the teas and silk of Japan; these our country admits free of duty, taking the entire export of the former, with the exception of a trifling amount shipped to England, and a large and increasing quantity of the latter. The export of tea to the United States for the past season amounts to 34,000,000 pounds, and the export of silk has risen from 150 bales to 4200 bales during the past three seasons; for the silk alone more has to be paid than is received for the kerosene shipped to this country.

The foreign carrying trade of the United States is now mainly restricted to sailing vessels of large tonnage, which are limited to very few voyages, owing to the difficulty of providing within a reasonable time the amount of cargo required to fill them. Within the past two years such large blocks of oil have been offering for Japan that freighters have been able to employ a large fleet of these vessels at such paying rates that the homeward voyage, contrary to all experience hitherto, has become quite a secondary affair. To close this avenue of employment, so recently opened, by an obstructive duty would work great injury to the interests of American ship owners.

The importation of kerosene is already beset by many difficulties with which the trade of no other country has to contend. The course pursued by the authorities last summer, in neither providing the necessary storage nor allowing the importers to do so until too late to meet the emergency, was the cause of serious embarrassment and loss to those concerned, and obliged many to make forced sales of their oil.

Exorbitant rates of insurance are charged by European companies (the only insurers available), who have formed an extravagant estimate of the hazardous nature of the risk, and more than double the cost of lighterage and other expenses is incurred by the remote position of the public warehouse devoted to the storage of kerosene than has to be paid on other goods landed at the Habata. To increase these difficulties by the imposition of an extraordinary duty, which must be paid in cash, there being no provision for bonding the oil, while staples from other countries are taxed but lightly, seems open to the imputation of an unfriendly discrimination against the trade of a too compliant neighbor.

That the excellent light which kerosene affords, at a minimum of expense, is a great boon to the people of Japan, no candid person will deny. It has added hours to the short winter days, and many trades are now carried on until late in the evening which formerly had to cease with daylight.

Before the introduction of kerosene no fine work could be done after dark, and no light suitable for reading or study could be obtained. In the homes of the poor a feeble, smoky flame was obtained from fish oil, while those who could afford it procured a slightly better light from rape-seed oil; the cost of the former is yen 2.85 per ten gallons, and of the latter yen 6.50, that of kerosene being less than yen 2.50, and by far the best results are obtained from it.

This oil has become, in a marked degree, one of the necessities of life in Japan, and to increase its cost, as proposed, would be a heavy tax upon all classes and a great injustice to the poor. We remain, Dear Sir, Very truly yours,

FRAZAR & CO.

AN ENTIRE NEW MAKE OF
MINE LAMP.
THREE DIFFERENT
SIZES
SPOUTS
SEND
15 CENTS
FOR SAMPLE
TO
LEONARD BROTHERS,
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MINES: Lehigh Valley, Pa. WORKS & FURNACES: Bergen Port, N. J.
The only Miners and Manufacturers of

PURE
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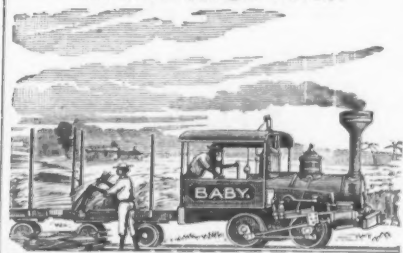
Especially adapted for
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Also manufacturers of
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Superior for LIQUID PAINT on account of its body and wearing properties.

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Plantation Locomotive, also adapted to other light special service.

H. K. PORTER & CO.,
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Builders of every variety of
LIGHT LOCOMOTIVES.

Illustrated Catalogue mailed on application.

ROME IRON WORKS,
Manufacturers of
Brass, Gilding Metal, Cop-

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(In Sheets, Rods, Tubing or Wire),
COPPER & BRASS RIVETS
AND BURS.

Rome, New York.

A. F. PIKE,

Pike Station,

NEW HAMPSHIRE.

(ESTABLISHED 1823.)

HEADQUARTERS FOR SCYTHE, AXE, KNIFE, HACKER AND TOOL STONES.



Twenty Quarries and Four Factories in New Hampshire and Vermont.

Strong, Clear Crit Stone
that will not glaze.

PRICES & QUALITY GUARANTEED

All Goods Genuine Brands.

My customers may rely upon being squarely dealt with and getting no poor, unsalable imitations.

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No. 1, Extra Indian Pond.
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The only Manufacturer of Genuine, Old Reliable Indian Pond (Red End).

Stones manufactured, labeled and branded in any manner desired.

Beware of Coarse Brittle Imitations.

THE COLUMBIA BICYCLE.



Bicycle riding is unsurpassed as a method of traveling, whether for speed, sport or the renewal of health. No horse can compare with the Bicycle for endurance; no other pastime is half so fascinating, and the exercise is recommended by the medical profession as being most conducive to health. Appleyard rode 100 miles over a common turnpike road in 7 hours, and Waller has accomplished 1400 miles in 6 days.

Send 3-cent stamp for 24-page catalogue containing price-lists and full information, or 10 cents for catalogue and copy of "The Bicycling World."

THE POPE MFG. CO.

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EXCELSIOR LAWN MOWER



Roller Mower.

We solicit correspondence from the trade for prices and discounts.

We make *Seven Sizes of Roller Mowers* and *Six Sizes of Side-Wheel Mowers*. We claim for our Mowers

Perfect Work, Light Draft and Simplicity.

We have received many first premiums in competitive trials with other Mowers, both in this country and abroad. We have special patterns of Mowers for export, meeting the requirements of every market. Our new Horse Mower is conceded to be the *Lightest* and *Best* Horse Lawn Mower ever made. N. B.—We make no inferior or second quality Mower; Horse and Hand Lawn Mowers are alike guaranteed in all respects. Send for Illustrated Catalogue. Address

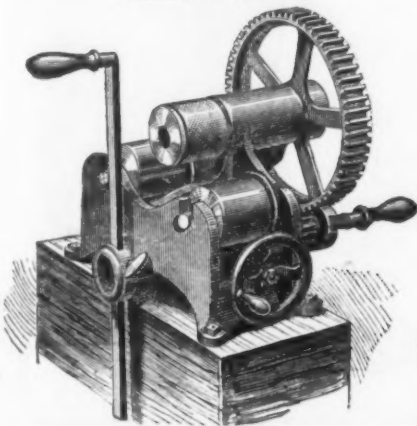


Side-Wheel Mower.

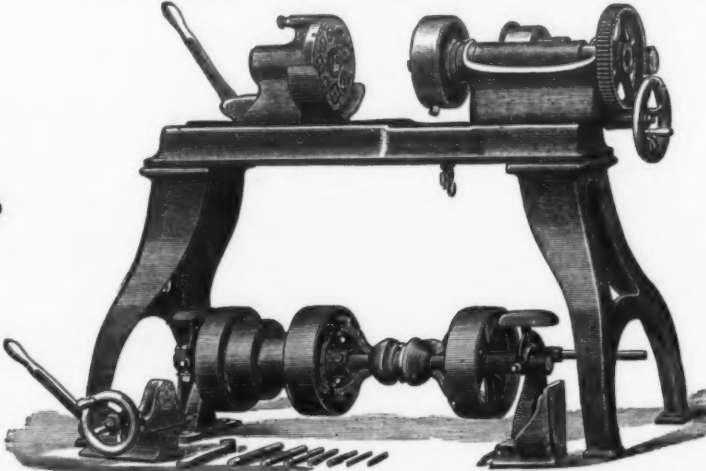
CHADBORN & COLDWELL MFG. CO., Newburgh, N. Y.

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LIGHTNING SCREW-CUTTING MACHINERY and GREEN RIVER TOOLS.



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Manufacturers of the well-known brands of

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Clipper, Emperor, Beardsley's Golden Trimmer, Conqueror, Dutchman, Waldron, &c.

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GREENFIELD TOOL CO.

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MANUFACTURERS OF

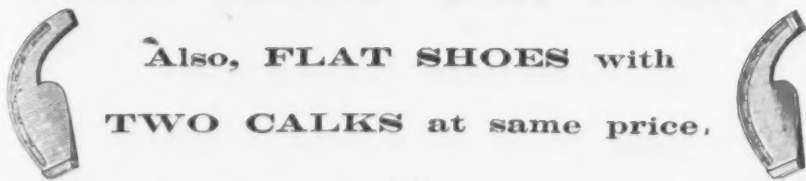


Fine Table Cutlery.

Solid Handled, Bone, Ivory, Rubber and Wood, Solid Steel Silver Plated.



PATENT CONCAVE FORGED OX SHOES.



Also, **FLAT SHOES** with

TWO CALKS at same price.

ALSO,

PLANES, PLANE IRONS, &c.

Torrey's Door Springs.

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Ice Cream Freezers.

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LIGHTNING HAY KNIVES,

WEYMOUTH'S PATENT.



This knife is the best in use for cutting down hay and straw in mow and stack, cutting fine feed from bale, cutting corn stalks for feed, cutting peat and ditching marshes.

The blade is best cast steel, spring temper, easily sharpened, and in giving universal satisfaction. A few moments' trial will show its merits, and parties once using it are unwilling to do without it. Its sales are fast increasing for exports as well as home trade, and it seems destined to take the place of all other Hay Knives.

They are nicely packed in boxes, one dozen each, of 50 pounds weight, suitable for shipping by land or water to any part of the world.

MANUFACTURED ONLY BY

HIRAM HOLT & CO.,

East Wilton, Franklin Co., Maine.

For sale by the Hardware Trade generally.

ESTABLISHED 1856.

SHELTON & CO.,

Manufacturers of every variety of

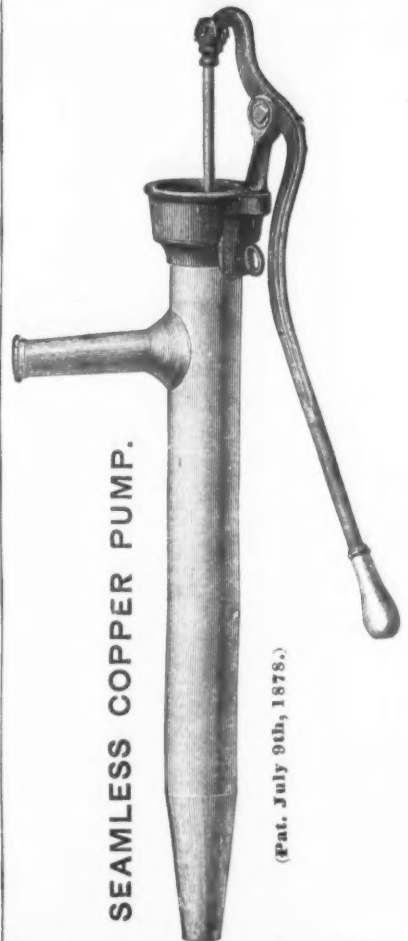


TACKS & SMALL NAILS.

Carriage, Tire, Machine, Plow, Stove and Spring Bolts, Coach and Bed Screws, &c.

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SEAMLESS COPPER PUMP.

(Pat. July 9th, 1878.)

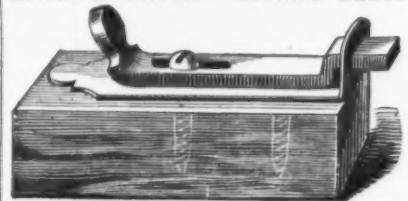
In addition to the great variety of Iron and Brass Pumps which we have been manufacturing for years, we are now making a full line of **COPPER PUMPS** under a patent granted July 9, 1878. The Barrel and Cone are drawn in one **SEAMLESS** piece. No brazing or soldering is required. Being made of as heavy stock, they are stronger and more durable, give a perfect valve seat, and require less repairs than those made in the old manner. The Barrels are tested with a five hundred pound inside pressure to the square inch. The Spout also is seamless. Dealer and Plumbers pronounce them far superior to any before in the market. The inside of the Pump and the working parts are thoroughly tinned, giving a healthy surface for the contact with water. The handle is convenient and nickel-plated. The Pumps are highly finished, neatly painted and decorated with gold bronze, the whole being a highly serviceable and ornamental article for a kitchen of the most costly residence. Discount to the trade, 25 per cent. No charge for boxing. Freight paid to Boston or New York. Orders for all varieties of Pumps filled promptly. Please send for price list.

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For sale in Boston by Walworth Mfg. Co. Hamblen & Matthews, Braman, Dow & Co., Eaton & Dana, Macomber, Bigelow & Dowse, M. C. Warren & Co., and Bogman & Vinal; in Providence by Belcher Bros., and in Worcester by C. Foster & Co. and White & Conant.

HYATT'S PATENT SPRING BOLT.



Patented Jan. 29th, 1878.

For Fastening Cabinet Ware, Closet and House Doors, &c.

We call the attention of the trade to these Wrought Brass and Iron Bolts, as being the best and cheapest in the market. Sizes, two inches and upward, both plain and neck bolts. Two screws fasten the bolt and bed-plate to the wood; no others are required; the bed-plates are made of brass, from which the spring is cut and raised, upon which the bolt slides with an easy, elastic movement, saving expense of screws and producing a strong, handsome and cheap Bolt. Price list furnished on application.

BRASS GOODS MFG. CO.,

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We also manufacture all kinds of Brass and Tin Goods, Drop Bases, Thimbles and Bases for Door Knobs, Plate Escutcheons, Brass Labels, Patent Mirror Business Cards, &c.

10,000 Sold the First Year.
THE BEST ADJUSTABLE BAG HOLDER
In the World.

PRICE ONLY \$1.50.

Sent free, on receipt of the price, anywhere in the United States.

It is made of iron, will fit any sack, wide or narrow, and will last a lifetime. Sold by Hardware and Agricultural Implement dealers everywhere. A large discount to the trade and agents. Your orders respectfully solicited, and agents wanted for this best selling article in the market.

Address,

L. JEFF. SPRENGLE,

Sole Manufacturer,

Ashland, Ohio.

Who would do with cut it for \$1.50. The platform does not go with the holder; it is extra if wanted.

COBB & DREW,
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Manufacturers of Copper, Brass, and Iron Rivets: Common and Swedes Iron, Leathered, Carpet, Lace and Glass Tacks: Finishing Hangers, Trunk, Closet and Cigar Box Nails &c. Rivets made to Order.

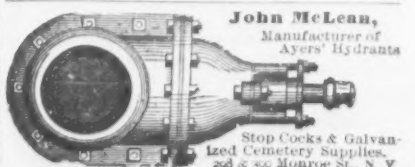
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HARDWARE,

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Agents for the Philadelphia Star Carriage and Tire Bolts.



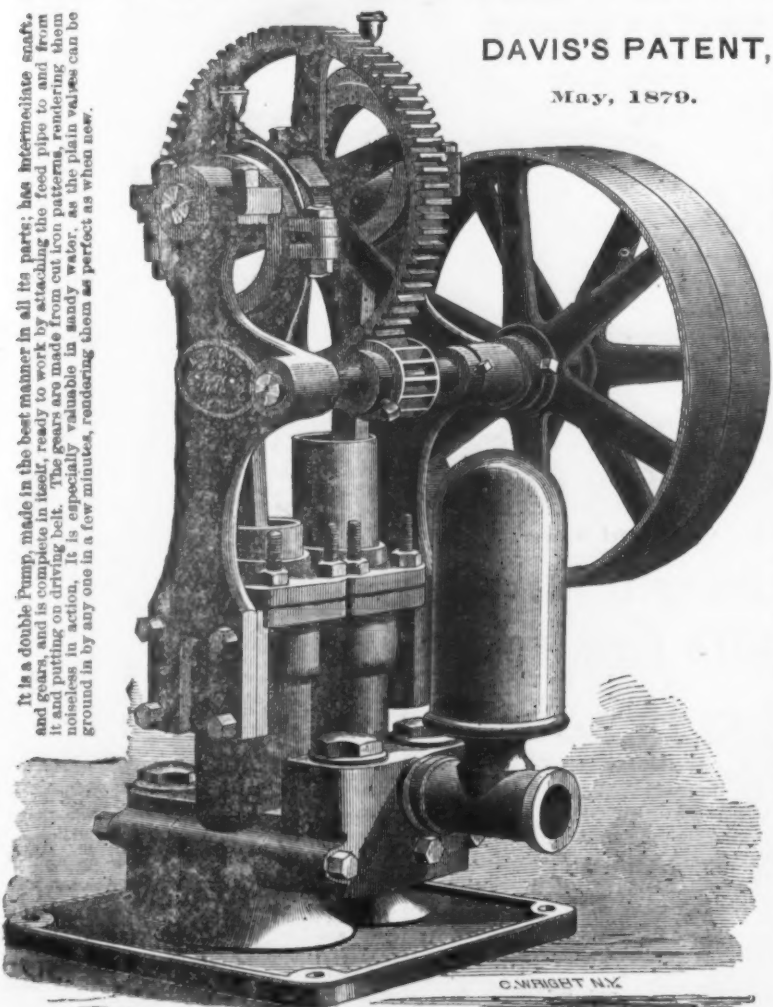
John McLean,
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Stop Cocks & Galvanized Cemetery Supplies.
2nd & 3rd Monroe St., N. Y.

THE ECONOMIC PATENT BOILER FEED PUMP

DAVIS'S PATENT,
May, 1879.

It is a double Pump, made in the best manner in all its parts; has intermediate shafts, and gears, and is complete in itself, ready to work by attaching the feed pipe to and from it and putting on driving belt. The gears are made from cut iron patterns, rendering them perfect in every detail. The pump can be ground in by any one in a few minutes, rendering them as perfect as when new.



INTERCHANGEABLE IN ALL ITS WORKING PARTS. Geared, 5 to 1.

I. B. DAVIS, Maker, Hartford, Conn.
FOR OLD AND NEW BUILDINGS.

Just what is Wanted, and Much Cheaper than Weights.
THE PATENT
SCREW WINDOW BALANCES

Recommended for all Sashes under Twenty Pounds Weight.

AN ADJUSTABLE SUBSTITUTION FOR SASH WEIGHTS.

A Modern Invention, equally available for Windows in old buildings, with a large saving of money by their use in new. They automatically retain Sashes at any point opened until their further ascent or descent is assisted by the hand, as when weights are employed. Doing the whole work within themselves, they cost, applied, less than one-half the cost of applied weights, with their complications of boxings, weights, cords, pulleys, hangings, adjustments, &c., &c.

Are out of sight when applied; are not handled in working; do not get out of order; are as easily applied as the Sash Pulley, and after being applied are instantly adjustable and readjustable, with a screw-driver, to the weights of the Sashes to which they may be applied.

With them Sashes raise without binding against the jambs, or the clashing and banging as with weights, or being stopped by knotted cords, &c., or the occasional expense of repairing broken cords, and with them Sashes lower with an ease and smoothness superior to those hung with weights.

This extremely useful Invention stands alone as an adjustable mechanical substitute for Sash Weights, and is invaluable for Windows in old buildings where weights cannot be applied.

Sample Set of Four Balances mailed free to any address on receipt of One Dollar in registered letter.

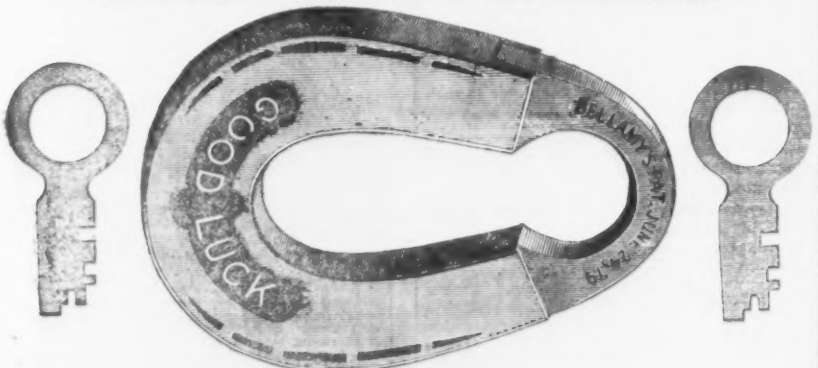
Retail Price \$1.00 per Set, 4 Balances.

Discounts to the trade. Address

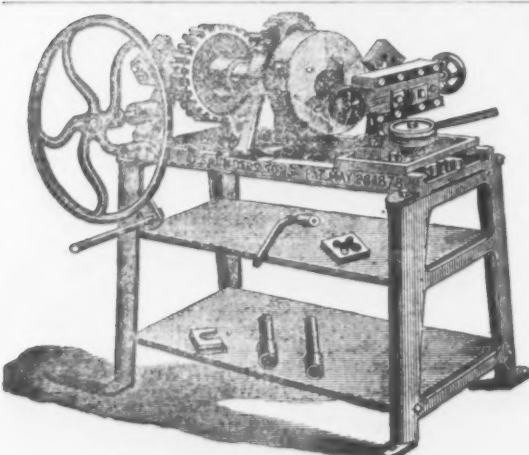
ROB'T B. HUGUNIN,
Sole Maker Screw Balances, **HARTFORD, CONN.**
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INFRINGEMENTS.—To whom it may concern:—As the inventor, patentee and solely authorized maker of the above named goods under the mentioned U. S. Patents covering the combined inventions constituting the Screw Window Balance, and all other similar goods using these combined improvements being infringements of the said combined inventions, patented as before stated, all dealers, users, makers and handlers of such are hereby notified that they will be held accountable, under the U. S. laws protecting inventions, for damages.

"HORSE SHOE PADLOCKS."



Made by **FERNALD & SISE, New York.**



Saunders' Sons'
NEW
PIPE-THREADING
MACHINE,
FOR
Hand or Power,

The IXL.
Manufacturers of
Steam and Gas Fitters' Tools,
Pipe Cutting and
Threading Machines,
for Pipe Mill use, &c., a specialty.
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Important to Railway Companies, Cities and Mine Owners.

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Sectional Cushioned Crusher,

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Will be found the most economical and reliable crusher ever offered to the public for crushing

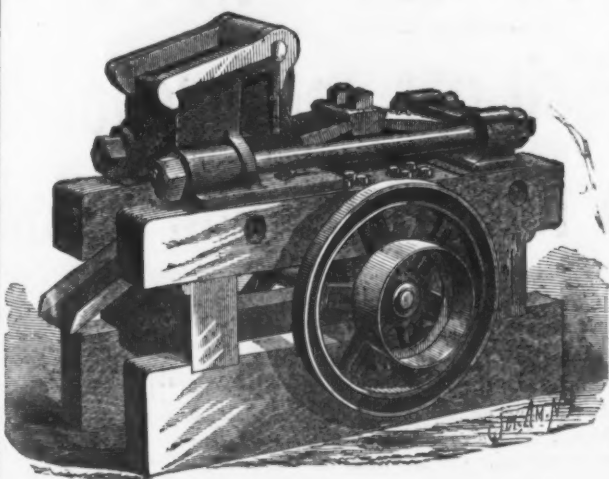
RAILWAY BALLAST, ROAD METAL, STONE FOR CONCRETE, QUARTZ, FLINT, EMERY, CORUNDUM, FELDSPAR, BARYTA, MANGANESE, PLASTER, SOAPSTONE, &c., &c.

This machine dispenses with cast iron frame and pitman of our old forms. All strains are on wrought iron or steel.

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Also all kinds of ENAMELED GOODS MADE OF WOOD, such as
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Furnished for Watching Pig, Scrap, Old Rails, &c.

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Established 30 Years.

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Patent Improvement in

ROPE GOODS.

No more Splicing or Winding
Ends with Cord.



No. 1.

Rope Halters, Horse Ties, Cattle Ties, Halter Leads, &c., made by clamping the lap with steel rings, as shown in cut. Also, clamping the end with a ring to prevent unbraiding.

This is all accomplished by machinery, and a superior article can be made at so much less cost, it will not pay any one to make up goods the old way. We are now prepared to furnish the trade the cheapest and best Rope Halters ever made. No. 2 illustrates the twisted and irregular form of the spliced Halter; also the insecure method of whipping the end with cord, which invariably comes off, and allows the rope to untwist. No. 3 illustrates the New Halter. It is made by clamping the lap with steel rings. The end is also secured with a steel ring, which will remain as long as the rope lasts. We have also a full line of

No. 2.

COVERT'S HORSE AND MULE JEWELRY.



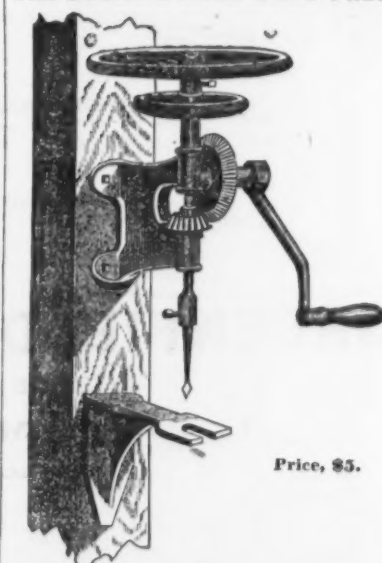
Consisting of Covert's Celebrated Harness Snaps, Swivel Snaps, Open Eye Bit and Chain Snaps, Snap and Thimble for Horse and Cattle Ties, Rope Goods, consisting of Horse Ties, Cattle Ties and Halter Leads, Leather Horse Ties, Breast Chains, Halter Chains, Martingale Chains, Keel Chains, Post Chains, Post Rods, &c. These goods are far superior to anything of the kind on the market. They have from real merit become standard, and never fail to give entire satisfaction. They are sold by all leading jobbers in general and saddlery hardware at manufacturers' prices. Send for illustrated catalogue and price list. Address **COVERT MFG. CO.** Sole Manufacturers, West Troy, N. Y.



Peerless Tea Kettle.

The most durable and handsome kettle in the market, having the breast, sides, and a strengthening portion for the spout all spun from one piece of sheet metal and double-seamed to the pit, so that the seam is brought under the sides of the kettle, forming a strengthening rib of four thicknesses of metal, at the point of greatest wear, upon which it rests when on the stove. By this means the objections to all other copper kettles are overcome. Sole manufacturers, **SUNDY MFG. CO., Buffalo, N. Y.**

THE BUCKEYE HAND DRILL PRESS



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Is the cheapest and most desirable Drill made. We will warrant them all to do good work and readily bore a 3/4-inch hole in any tire. It is especially adapted to Blacksmiths, Carriage Makers, &c. Send for circular to A. E. FOLGER & CO., Springfield, O. Discount to the trade.

The Most Durable and Best Selling Bucket for Chain Pumps.

It has no valves to become obstructed and no screw joints to become immovable by rust.

Advantages of the Crosby Bucket over all others:

1. It has an air chamber on top, which conducts the air to the bottom of the well.
2. It is self-expanding, the base of the bucket being 1/2 of an inch larger at bottom than bore in the tubes, which allows it to expand, and the groove in the side to contract.
3. The wear comes on the whole side, and not on the extreme edge like other buckets.
4. It contains more solid rubber than three of any other manufacture.

No charge for territorial rights. Send for Price List. Agents wanted in every county. Address **A. D. CROSBY, Patentee and General Agent,** Cuba, Allegany Co., New York.



SWEETLAND & CO.,

126 Union Street, New Haven, Conn.,

SOLE MANUFACTURERS OF

THE SWEETLAND COMBINATION CHUCK.

UNIVERSAL, INDEPENDENT AND ECCENTRIC.

Price List and description furnished upon application.

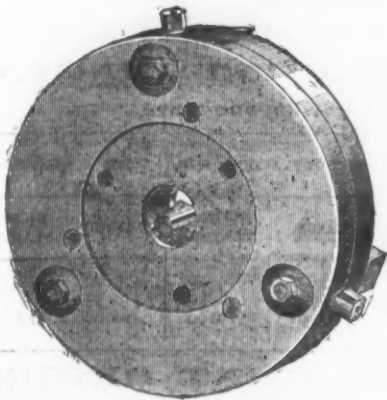


Fig. 5.—Back View.

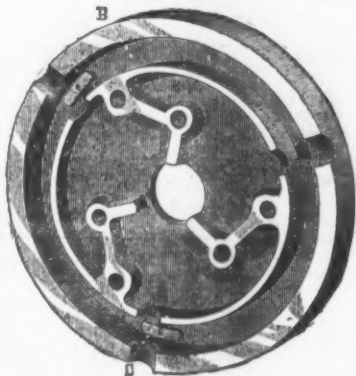


Fig. 2.—Back Plate.

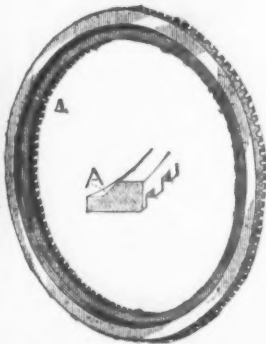


Fig. 1.—Circular Rack.



Fig. 3.—Cam Block and Spring Washer.



Fig. 3.

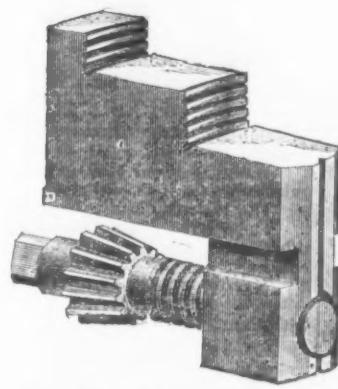


Fig. 4.—Improved Jaw.

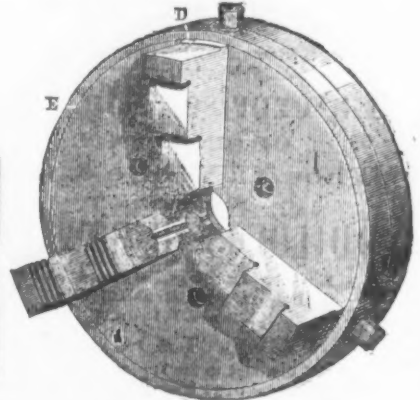
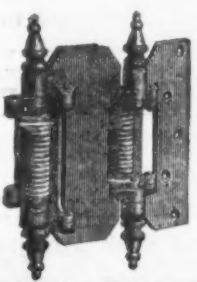
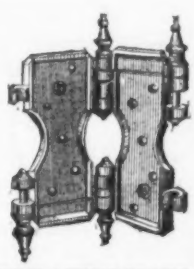


Fig. 6.—Front View.



DOUBLE ACTING BUTT.



DOUBLE ACTING BLANK.

THE COWLES HARDWARE COMPANY,

Unionville, Conn., U. S. A.,

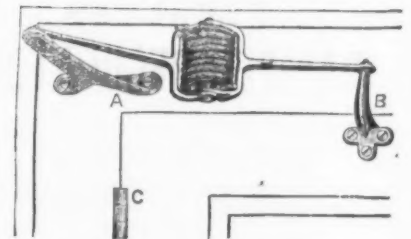
Manufacturers of Household Hardware**Geer's Single and Double Acting Spring Butts and Blanks.**

Reverse in principle. Placing the power where most needed, viz.: **EXERTING** their **GREATEST FORCE** when the door is **CLOSED**; offering **LESS RESISTANCE** the **WIDER** the door is **OPENED**; **RETAINING** the door **OPEN** after passing the right angle; **HOLDING** the door **UP FIRMLY** at the **TOP**.

Also, **BLANK BUTT**, designed to be used in combination with our Double Spring Butts on Inside Doors of Dwelling Houses, Churches, Hotels, Restaurants or in any position where the doors are not subject to strong currents of air. With our New Blank Butt we furnish for inside doors the most effective as well as the cheapest Spring Butt in market. **Butts & Blanks for Screen Doors a specialty. Hercules Springs for Screen Doors a specialty.**

Perfect in Action, Very Low in Price.

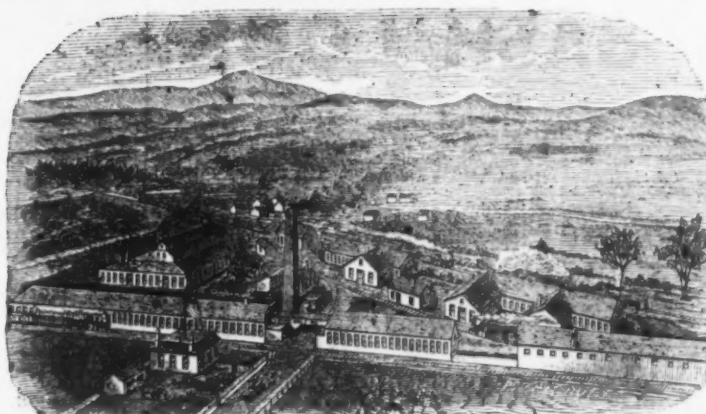
Send for Catalogue or Circulars with price lists. Mention this paper.

**HERCULES****Reverse Action Door Spring & Retainer.**

New principle, distinct from all others. Holds the door open as well as shut. Exerts its greatest force at the closing point. The best Spring in market.

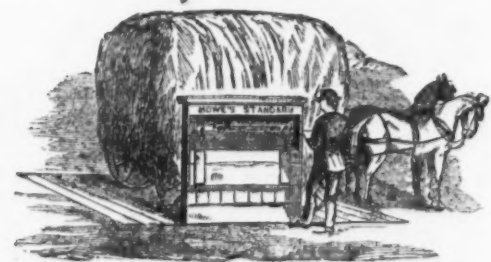
THE IMPROVED HOWE SCALES.

Made in Every

**Variety**

Works at Rutland, Vt.

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**Standard.**

The highest Awards have invariably been given the Improved Howe Scales wherever exhibited in competition with other makes.

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PAGE, FARGO & CO., 213 Market Street, Philadelphia.

BORDEN, SELLECK & CO., 97 Lake Street, Chicago.

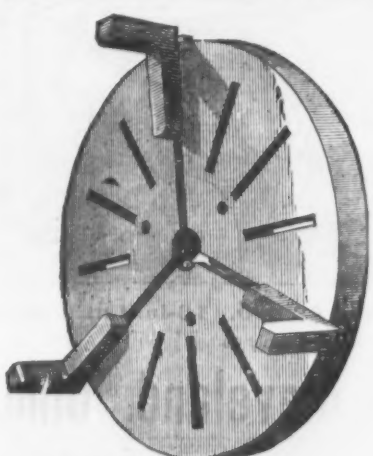
J. FRED. DENNIS, 8 & 9 Holborn Viaduct, London.

THE E. HORTON & SON CO.,

MANUFACTURERS OF

THE HORTON**LATHE CHUCK**

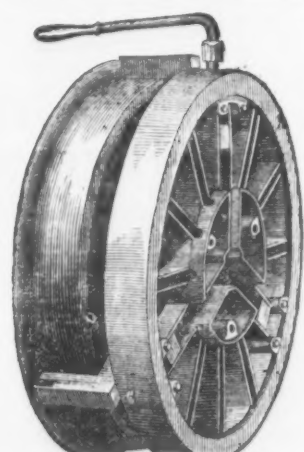
Windsor Locks, Conn., U. S. A.



Front View.

THE HORTON CAR WHEEL CHUCK.

This Chuck can be attached to a boring machine table, or lathe, and will hold a car wheel 37 inches in diameter and less. The jaws are made long to fit both tread and flange of car wheels, thus truing them both ways. For general machine work it is very useful, and will hold firmly any work that can be held in a Chuck.



Back View.

THE HORTON CAR WHEEL CHUCK.

This cut represents the Horton Car Wheel Chuck holding a car wheel in proper position for boring, the flange and tread of the wheel assuming a true position on the lath. For accuracy and ease of operation this Chuck has no equal.

SUPERIOR QUALITY
MICA
 North Carolina
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 We are prepared to furnish
 Stove Manufacturers,
 Oil Stove Manufacturers,
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 WITH
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 of very best quality.
 Estimates furnished on application.
 J. S. & M. PECKHAM,
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Thos. C. White & Co.,
 Manufacturers of
BUILDERS' HARDWARE,
 Locks, Latches, Hinges and
 Brass and Bronze Goods
 of all kinds.

JAIL LOCKS.
 Liberal Discount to the Trade.
 Office & Factory, No. 50 Central Ave.,
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TO STEAM USERS

Save Fuel and Money.
 Obtain regular speed and prevent explosion by using

**PEERLESS
 DAMPER REGULATOR,**

the greatest fuel-saving appliance ever invented.
 Adjustable to any pressure. In ordering mention
 pressure. Illustrated Catalogue sent on application.
 We set it up and guarantee performance. Price, \$75.

AMERICAN STEAM APPLIANCE CO.
 SOLE MANUFACTURERS,
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**THE
 "RIGHT SPEEDY"
 CORN SHELLER**
 Is the best Hand Sheller
 made; does the best work
 and works the best; is war-
 ranted five years.
 Agents Wanted in every County.
 Sample sent on receipt
 of \$5.00.
 Specially adapted for export.
 Address Patentee and Sole
 Manufacturer,
CURTIS GODDARD
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CLARK'S RUBBER WHEELS.

This wheel is the
 best now in the
 market, and is at-
 tracting the atten-
 tion of large manu-
 facturers on ac-
 count of the great
 saving of floors,
 which is ten times
 greater than the
 extra cost of this
 wheel.

Adapted to all purposes, viz., Warehouse trucks,
 platform trucks, scales, boxes, baskets and heavy
 casters. For full particulars see the first issue of The
 Iron Age next month, or address
GEO. F. CLARK, Windsor Locks, Conn.

TATE & COMPANY,
 MANUFACTURERS OF
BRAIDED WIRE PICTURE CORD,
 Also BONNET AND WAX FLOWER WIRE,
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These goods were awarded the only premium at the
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Mellert Foundry & Machine Co.,
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 (Works Established at Reading, Pa., in 1848.)
 Manufacturers of

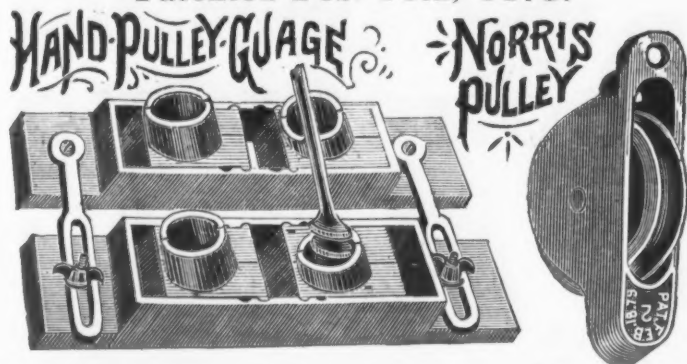
CAST IRON WATER AND GAS PIPE,
 With special Castings, Flange Pipe, Water Gates, Fire
 Hydrants, Lamp Posts, &c. The Improved Cana-
 dian Turbine Water Wheel, Machinery and
 Castings of every description for Furnaces, Rolling
 Mills, Grist and Saw Mills, Mining Pumps, Hoists, &c.
 Columns, Brackets, Iron Railings, &c.
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**NATIONAL
 BOLT
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 GUARANTEED AHEAD OF ALL
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Keystone Screw Co.
 17th and Fenango Streets,
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J. BILLERBECK,
 Manufacturer of
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NORRIS SASH PULLEY AND GAUGE.

Patented Feb. 18th, 1879.



With one of our Gauges a carpenter can put in 20 Norris Pulleys in the time re-
 quired for one of the old style.
 The Hand Gauge is retailed for \$1.00 each.
 The Power Machines are used by all the principal Sash and Blind Factories in
 this country, as they cannot dispense with them and compete with those who use them.

"BOSS" MOLASSES CATES
 with Ratchet Thumb Screw, so they can be made as tight as desired.

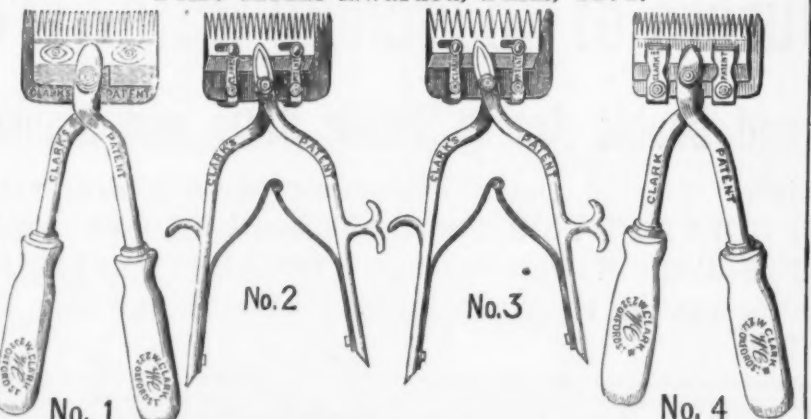
KIMBALL'S SOLID CAST STEEL SHOVELS AND SPADES
 For Sale to the Trade and Exporters Only.

KIMBALL SHOVEL COM'Y,
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OFFICE, NO. 5 GERMAN STREET, BALTIMORE, MD.

A Sample Pulley, by Mail, costs 12 cents.

CLARK'S PATENT HORSE CLIPPERS.
 Prize Medal Awarded, Paris, 1878.



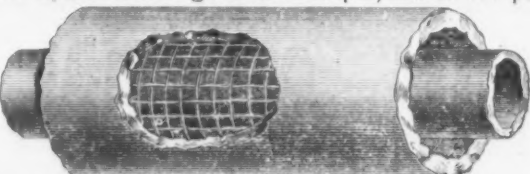
No. 1.—This well-known Instrument has now been before the public for many years, and has given uni-
 versal satisfaction, and is everywhere acknowledged to be by far the best, and therefore the cheapest in the
 market. Nos. 2 and 3 have also met with great success. No. 2.—ONE-HANDED CLIPPER, for heads, manes,
 quarters and difficult parts, leaving one hand at liberty to hold the horse, thus enabling the clipping to be
 performed by one man only. No. 3.—Same as No. 2, but with coarser teeth, for legs and bellies, and coarse
 hair, which would break the finer teeth. Avoiding the necessity of getting under the animal, and the consequent
 liability of accident to the man and also to the machine itself. No. 4.—TWO-HANDED INSTRUMENT, with the patent grasshopper springs over the plates. This
 improvement renders the machine simply perfect, producing a softness and ease of motion not to be sur-
 passed, while by the peculiar and continuous self-acting pressure of the spring the two plates are kept in
 cutting contact, and the machine requires no further adjustment whatever. These springs are also applied to
 Nos. 2 and 3. No. 4.—No stable should be without this set of incomparable instruments. See that all these
 Machines are fully stamped in strict accordance with the above illustrations—none others being genuine.
 To be obtained wholesale of Messrs. McCoy & Co., 134 Duane St., and Messrs. Roseman Bros.,
 124 Chambers St., both of New York, and all merchants in the United States; and retail, of all Saddlers,
 Ironmongers and Cutlers in the world, and of the Patentee, W. Clark, 232 Oxford St., London.

"PINNACLE" SASH LOCK.

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ASBESTOS MATERIALS, FIBER, MILLBOARD, PACKING & CEMENT.
THE NATIONAL STEEL TUBE CLEANER.
 Saves its cost every time it is used.
 The Patent "Air Space" Coverings for Steam Pipes, Hot-Blast Pipes, Boilers, &c.



Plastic or Hair Felt, with or without the Patent "Air Space" Improvement.
THE CHALMERS-SPENCE CO., foot 9th St., E. R., New York.

Delusion Rat and Mouse Trap,

Formerly manufactured by
CLAUDIUS JONES & CO.,
 At Bridgeport, Conn.,
 Have Removed to **ERIE, PA.**
 This is the most successful Rat and Mouse
 Catcher on the market.
 Send for Price Lists.

**TURNED
 MACHINE SCREWS,**
 One-sixteenth to five-eighths diameter.
 Heads and points to sample.
IRON, STEEL AND BRASS.
JOHN FELLOWS,
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SPRING HINGES

WITH
 Patent Anti-Friction Springs,
 FOR
SCREEN DOORS.

PRICE LIST.—Per Dozen Pairs.
SINGLE JOINT HINGES.
 (To Swing one Way.)

SIZE.	WITHOUT ACORN TIPS.		WITH ACORN TIPS.	
	BRASS.	NICKEL PLATED.	BRASS.	NICKEL PLATED.
2 3/8 inch.....	\$ 3 00	\$ 4 50	\$ 5 00	\$ 6 50
3 ".....	4 50	6 50	6 75	8 75
5 ".....	7 50	10 00	10 00	12 50

DOUBLE JOINT HINGES.

(To Swing both Ways.)
 To be used on Door 1 inch thick, or less.

SIZE.	WITHOUT ACORN TIPS.		WITH ACORN TIPS.	
	BRASS.	NICKEL PLATED.	BRASS.	NICKEL PLATED.
2 3/8 inch.....	\$ 6 60	\$ 9 00	\$11 50	\$14 25
3 ".....	8 30	11 50	13 50	17 00
5 ".....	16 50	21 00	21 50	26 00
6 " Double for Office Doors.....				54 00

The large cut represents full size of our 5-inch
 Double Joint Acorn Tip Hinge for mortising.
 The small cut represents the plain Single Joint
 Hinges, but not full size.
 Sample pair will be sent by mail on receipt of
 price

Liberal Discount to the Trade.
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PATENT
 Elliptic Spring Whistles



FOR
 SPEAKING TUBES.
 Patented April 15th, 1879.

We call the attention of the trade to the whistle for speaking tubes, represented in above cut,
 being superior, in a mechanical point of view, on account of the

PATENT ELLIPTIC SPRING,

which is much less liable to break and get out of order than the spiral spring usually used. These
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 styles at very reasonable prices. Send for illustrated circular and quotations.
 We also invite an examination of our **PATENT REVERSIBLE DOOR LOCKS**, which
 by their peculiar construction, combine simplicity, strength and durability. In these Locks
 the combination of the Patent Lever and Spring renders the latch movement very easy and prompt in
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 Illustrated catalogues and price lists furnished on application.

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 Manufacturers of Superior Building Hardware.
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THE OHIO LAWN MOWER.



12-in. Cut...\$18.00. 14-in. Cut...\$20.00. 16-in. Cut...\$22.00.
 For trade discounts, apply to

OHIO MFG. CO., Cleveland, Ohio.

**NORTH'S PATENT
 Universal Lathe Dog.**
 It is very strong. Holds very strong. Will not
 deface finished work. Holds round square or ir-
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 work and will not "akey." Is more evenly bal-
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 Send for circular.
SELDEN C. NORTH, No. 347 North Fourth Street, Philadelphia, Pa.

The Iron Age Directory

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BUCKER & BETTET,

PIPE & PLATEWORKERS'

TOOLS SUPPLIES.

Estimates for Complete Outfits Furnished.

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Bellevue Manufacturer,

Johnson Street,

Cor. 22d St.,

CHICAGO, ILL.



IVES' PATENT BURGLA-PROOF DOOR BOLTS

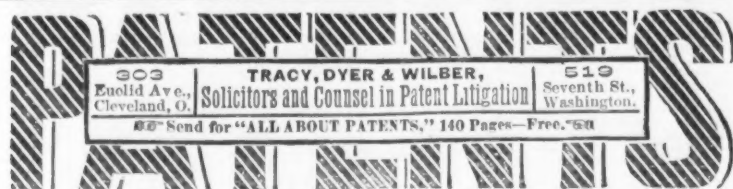
Easy Applied, Sure Protection and Pleading Finish.

HOBERT B. IVES

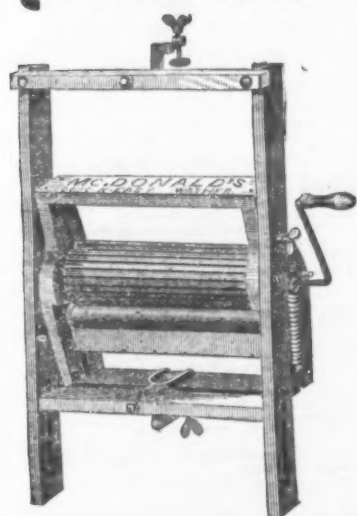
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187 St. John St., New Haven, Conn.

Send for Catalogue.



McDONALD'S QUICK AND EASY WASHER.



THE MOST THOROUGH
AND PERFECT WASHER
IN THE WORLD.

SAVES THE LINEN,
SAVES SOAP,
SAVES TIME.

A Day's Wash can be done in two
hours. It will fit all kinds
and sizes of Tubs.

ALSO,

McDONALD'S Centennial Prize Wringer.

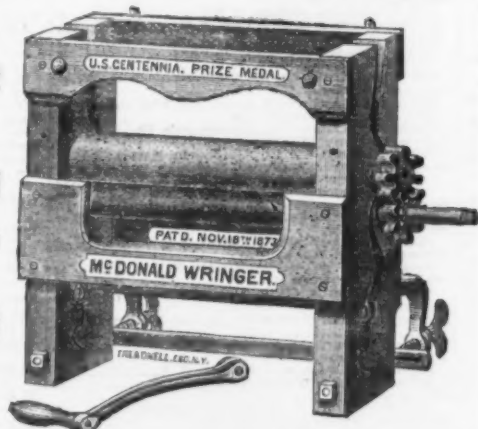
Warranted Superior
TO ANY WRINGER
In the World.

IT SELLS ON SIGHT!

Address all inquiries and send all
orders to

Graham & Haines

113 Chambers St.,
NEW YORK.



JAMES, AIKMAN & CO.'S PATENT IMPROVED METALLIC EXCELSIOR REFRIGERATOR

Manufactured by

JAMES, AIKMAN & CO.,
No. 25 Cliff Street, New York.

For Sale by W. W. Montague & Co., San Francisco, Cal.; Wm. Blair & Co.,
Chicago; F. H. Lawson & Co., Cincinnati.



It is made of galvanized iron, circular in form, set on casters, wastes no room, and is light and easily moved. The outside is painted in imitation of oak. The interior is arranged with rotary adjustable shelves, which can be regulated at pleasure. The double cylinder forming an air-tight chamber, in connection with the arrangement of the ice-chamber and the ventilator, makes the action of the Refrigerator perfect, and all the parts are so arranged as to be easily kept clean and sweet. The provision chamber, being under and separate from the ice-box, is free from ascending vapors. It is the only Refrigerator that imparts no taste or smell to its contents. It contains a water-cooler, furnishing ice-water without additional expense.

No.	Diameter.	Height.	Price.	No.	Diameter.	Height.	Price.
20	21 inches.	34 inches.	\$17 00	24	25 inches.	39 inches.	\$26 00
22	23 "	36 "	21.50	27	28 "	41 "	34.00

VERMONT SNATH CO.,
MANUFACTURERS OF THE
No. 00 and 000 Patent Swing Socket Snaths.
SPRINGFIELD, VERMONT.

Represented in New York by LAMSON & GOODNOW MFG. CO.

RHODE ISLAND HORSE SHOE CO.,
MANUFACTURERS OF
Horse, Mule & Snow Shoes of the Perkins Pattern.
Works at Valley Falls, R. I., and Buffalo, N. Y. Office, 31 Exchange Place, Providence, R. I.
W. CARPENTER, President. C. H. PERKINS, Gen'l Manager. R. W. COMSTOCK, Secretary

CROSS CUT SAWS.

Caution to Manufacturers of, Dealers in, and Users of Cross-Cut Saws and One-Man Cross Cuts:

Dealers in and Manufacturers of Saws, and Hardware Dealers generally, are hereby notified that the undersigned are the owners of the reissued Patent for Saw Handles, No. 8996, Nov. 18, 1879, original patent, Jan. 18, 1870.

Every Cross-Cut Saw having a handle, part of which, adapted to one hand, is above the blade, and part, adapted to the other hand, opposite the end of the blade, is an infringement of the said patent, and prompt legal proceedings will be taken against manufacturers of and dealers in saws provided with such handles.



The following is the claim on which we rely:

"In a cross cut saw, the combination of the saw-blade with a handle, part of which, adapted to one hand, is above the said blade, and part, adapted to the other hand, directly opposite the end of the said blade, all substantially as set forth."

HENRY DISSTON & SONS,

KEYSTONE SAW WORKS, Philadelphia, Feb. 17, 1880.

HOWSON & SON, Philadelphia and Washington, Attorneys for DISSTON & SONS.

DOUBLE ACTION RATCHET SCREW DRIVER.

ONE OF THE VERY BEST TOOLS EVER INVENTED.



It combines greater Strength, Convenience and Durability than was ever obtained in a common Driver.

COULTER, FLAGLER & CO., Agents, 87 Chambers St., New York City.



C. W. Dunlap & Co.,
43 CHAMBERS ST., NEW YORK,

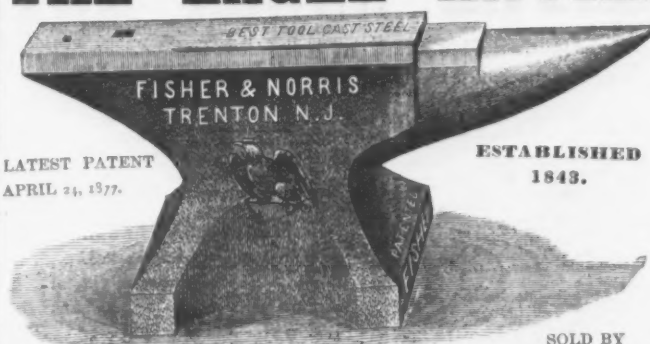
MANUFACTURERS OF ALL KINDS OF

GARDEN TOOLS

Catalogues furnished on application.

THE "EAGLE" ANVIL.

WARRANTED!!



LATEST PATENT
APRIL 24, 1877.

ESTABLISHED
1843.

Better than the Best English Anvil.
Face in one piece, of BEST TOOL CAST STEEL. PERFECTLY WELDED, perfectly true; of hardest temper and never to come off or "settle." It does not bounce the hammer back, and therefore can do more work with lighter hammer. Horn of tough untempered steel, never to break or bend. Only Anvil made in United States fully warranted as above. None genuine without our trade-mark.

PRICE LIST, APRIL 1, 1880.

ANVILS weighing 10 lbs. to 80 lbs. 10 cents per lb.

SMALLER ANVILS ("MINIMS.")

Weighing about

No. 1 2 3 4 5 6 7 8 9 10

Size of face, square

1 1/2 2 2 1/2 3 3 1/2 4 4 1/2 5

1 1/2 2 2 1/2 3 3 1/2 4 4 1/2 5

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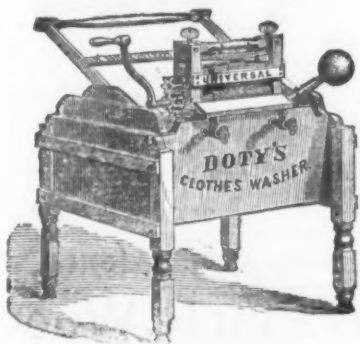
METROPOLITAN MANUFACTURING COMPANY,

32 CORTLANDT STREET, NEW YORK,

MANUFACTURERS OF

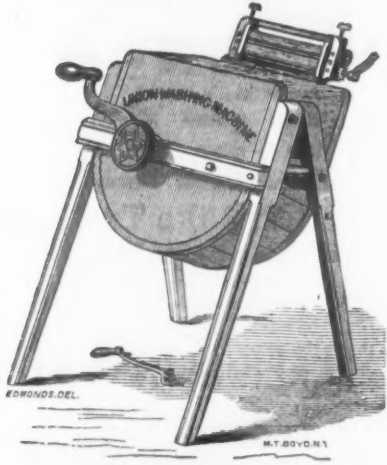
CLOTHES WRINGERS, WASHING MACHINES AND MANGLES.

DOTY'S IMPROVED CLOTHES WASHER.



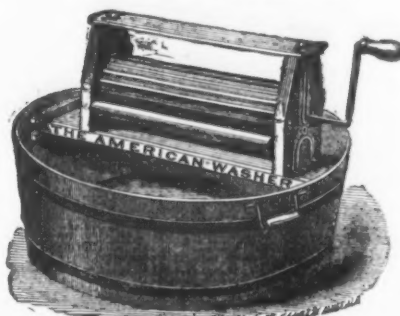
Size, 2 ft. 4 in. x 2 ft. 6 in.
Family Size, \$14.00; Wholesale, \$9.00
Hotel " 16.00; " 10.00

UNION WASHER.



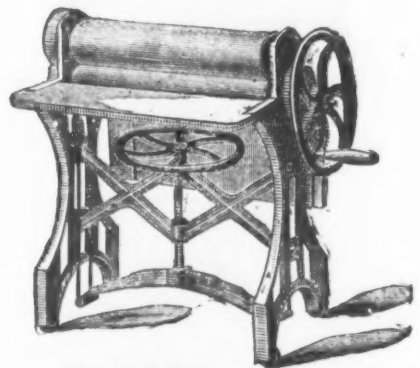
Size, 3 ft. x 2 ft. 2 in.
Retail, \$18.00; Wholesale, \$12.60.
With Wringer, \$27.00; Wholesale, \$18.50.

THE AMERICAN WASHER.



This Washer is simple in construction and easy of operation.
Price, Retail, \$4.00
Per doz., Wholesale, \$12.00

AMERICAN MANGLES.



SIZE OF ROLLS. (Discount to Trade, 25 %.)
Length. Diameter.
No. A, 33 in. 6 in., worked by hand, \$100.00
No. B, 33 in. 6 in., steam power, 125.00
No. 1, 26 1/2 in. 6 in., steam power, 100.00
No. 2, 26 1/2 in. 6 in., worked by hand, 75.00
No. 3, 23 in. 5 1/4 in., worked by hand, 50.00

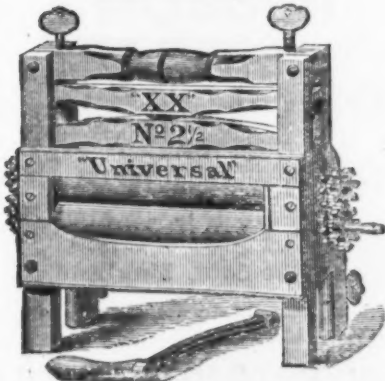
"UNIVERSAL" AND "NATIONAL" CLOTHES WRINGERS.

NATIONAL, No. 2 1/2.



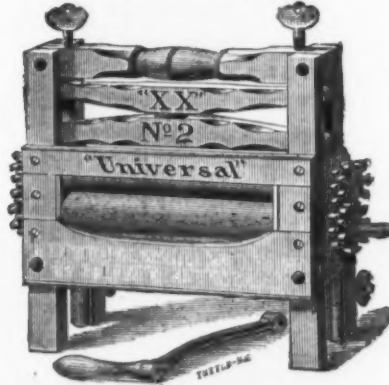
Size Rolls, 10 in. x 1 1/4 in.
Retail, \$7.50; per doz., \$63.00.
Galvanized Malleable Iron Frame. Can neither break, rot nor rust.

UNIVERSAL, No. 2 1/2. Small Family Size.



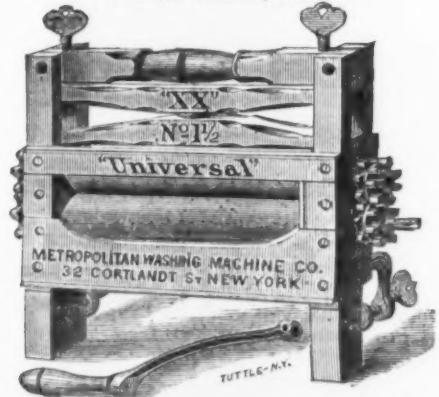
Size Rolls, 10 in. x 1 1/4 in.
Retail, \$7.50; per doz., \$63.00.
Frame the same as No. 2 Universal.
Rowell's Cog Wheels at both ends.

UNIVERSAL, No. 2. Usual Family Size.



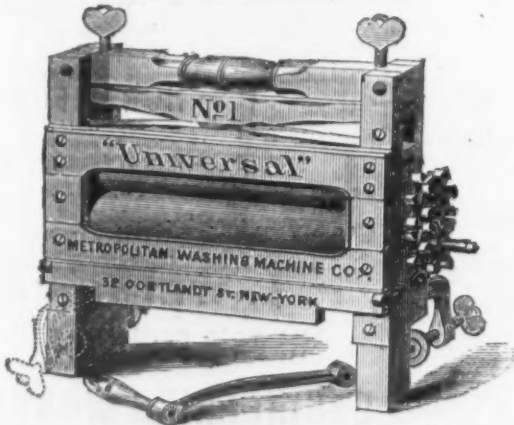
Rolls, 10 x 1 1/4 inch.
Retail, \$8.00; per doz., \$66.00.
Over 500,000 of this size have been sold.
Rowell's Cog Wheels at both ends.

UNIVERSAL, No. 1 1/2. Large Family Size.



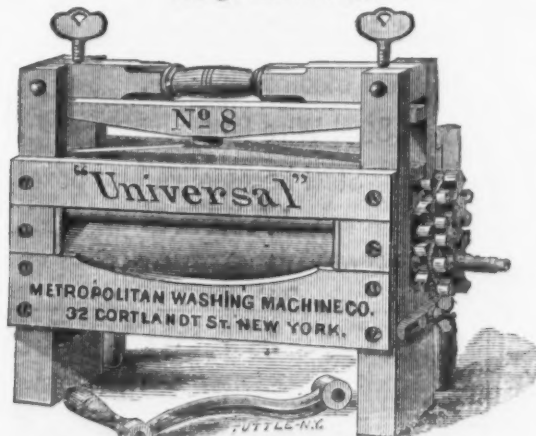
Rolls, 11 x 1 1/4 in. Retail, \$9.00; per doz., \$74.00
Swivel Clamps. Fits Round or Set Tubs.
This size, having longer Rolls and greater capacity than No. 2, wrings large articles with greater ease, and with less strain on the machine.

UNIVERSAL, No. 1. Hotel or Laundry Size.



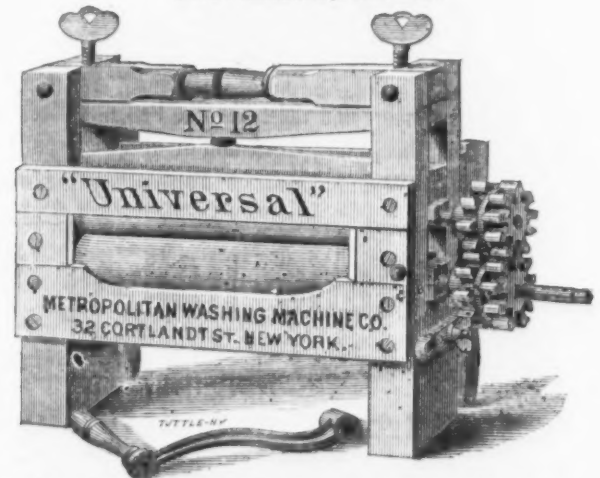
Rolls, 12 x 2 inch. Retail, \$12.00; per doz., \$93.00.
The best Set-Tub Wringer ever made. Swivel Clamps, arranged to swing either way. Wrings backward and forward from either side.

UNIVERSAL, No. 8. Large Hotel Size.



Rolls, 14 1/2 x 2 1/4 inch. Retail, \$16.00; per doz., \$144.00.
Adjustable Lever Clamps. Fits tubs of any thickness.
Rowell's Double Cogs, with alternate teeth, so long they never play out of gear. This Wringer is much used on Set Tubs in Hotels and large Laundries.

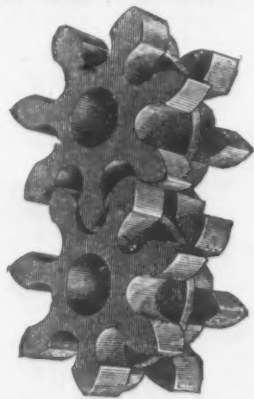
UNIVERSAL, No. 12.



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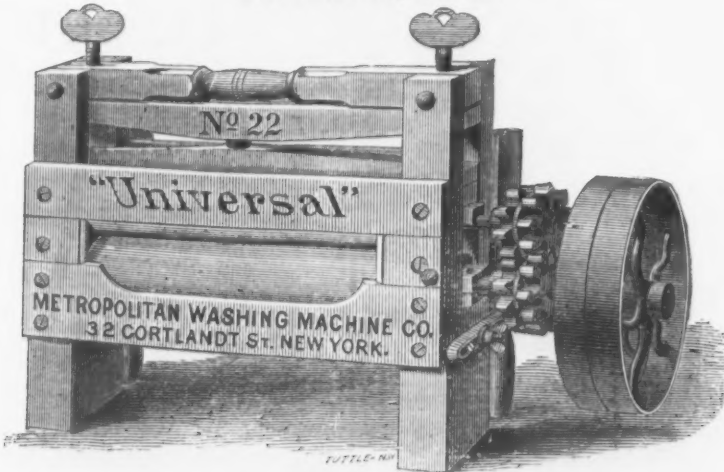
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With alternate teeth and rolling rim between, to prevent the teeth from "bottoming." These gears have longer cogs, can play apart farther without disconnecting, can never crowd together so as to bind, never work sideways out of place, wear more evenly and turn easier than any cog-wheel ever invented.

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See Page 3.

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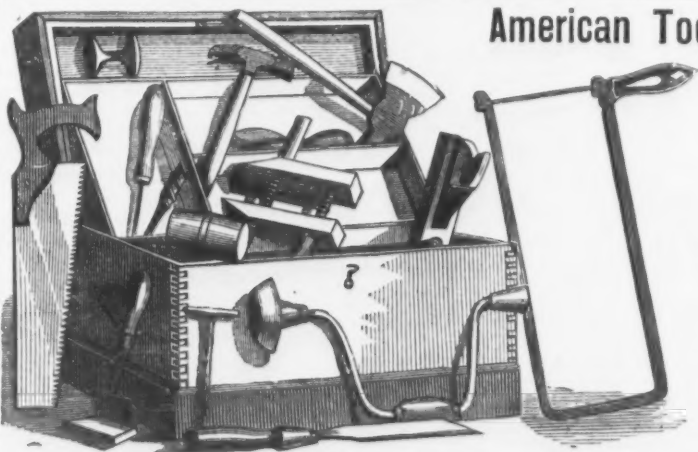
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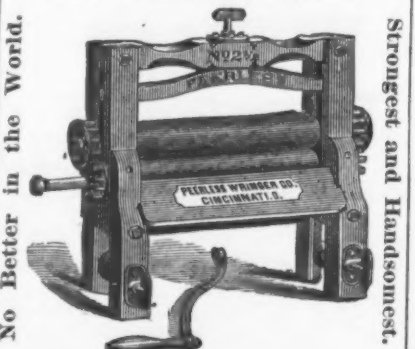
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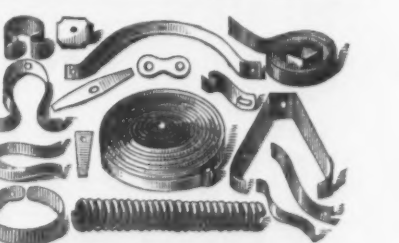


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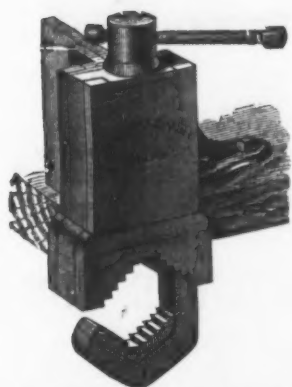
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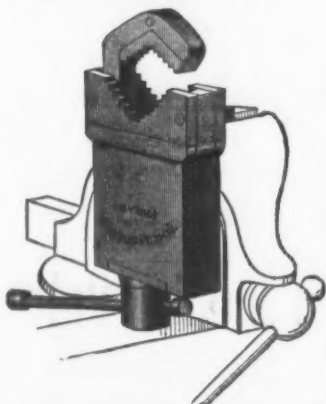
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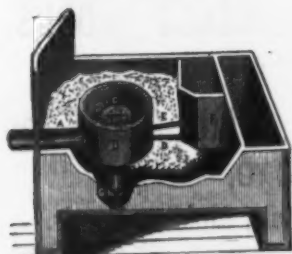
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The side of the forge is broken away to show the construction of the TUYERE.

This Tuyere can be placed in any Forge, with or without water.

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A 30-inch Bellows, No. 4, is equal to a 40-inch pear-shaped Bellows, and a boy of 5 years can work them.

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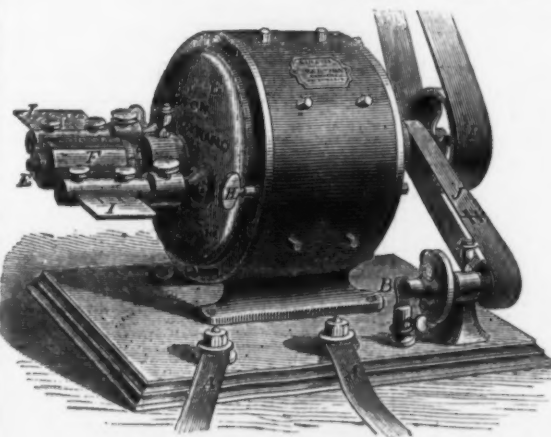
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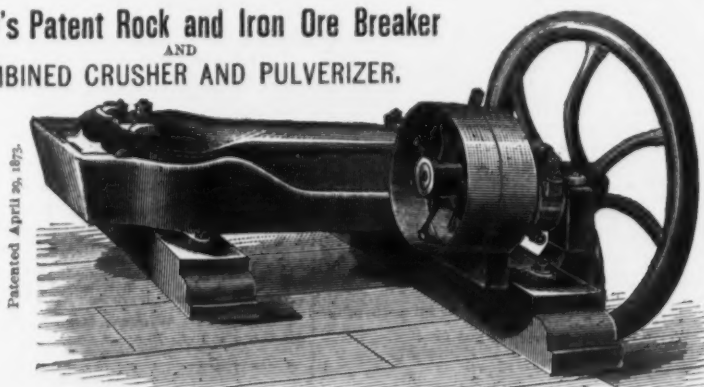
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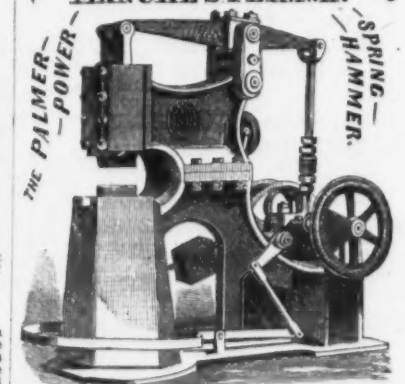
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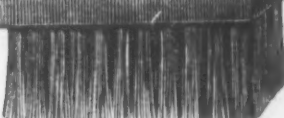
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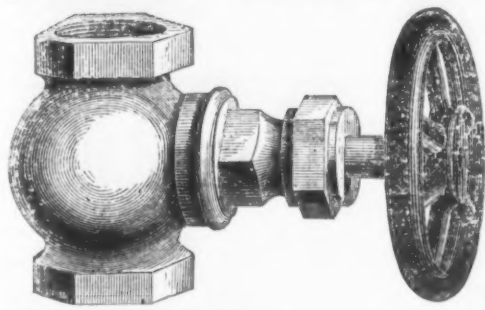


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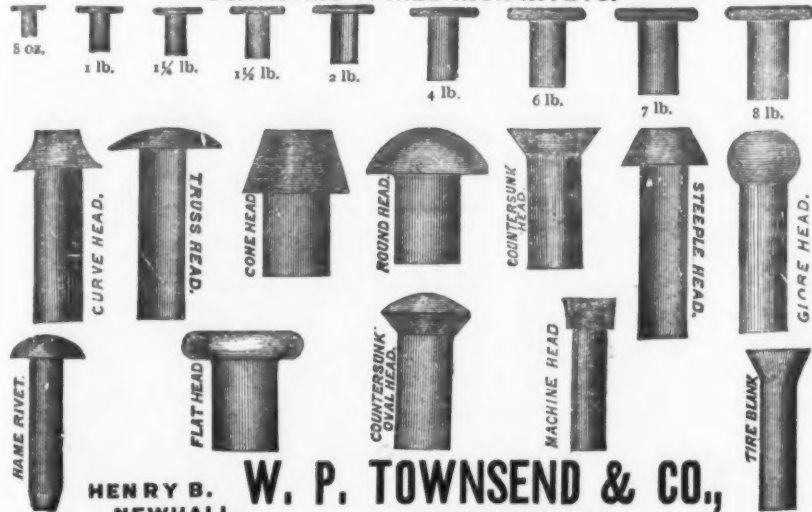


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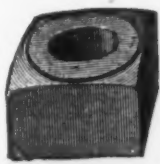
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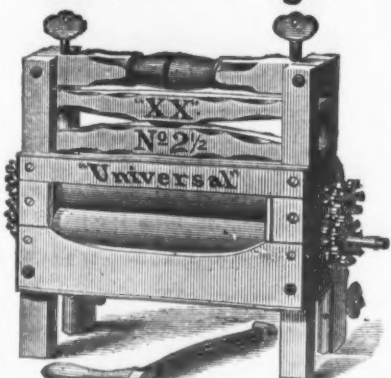
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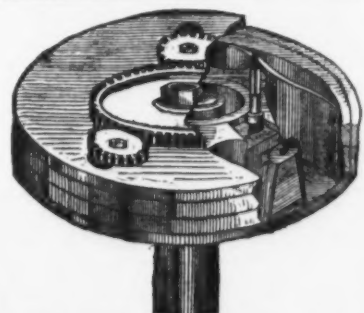
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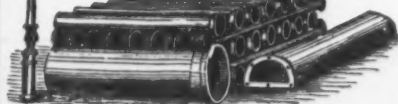
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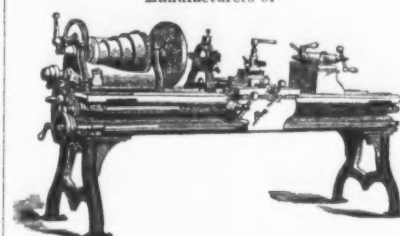
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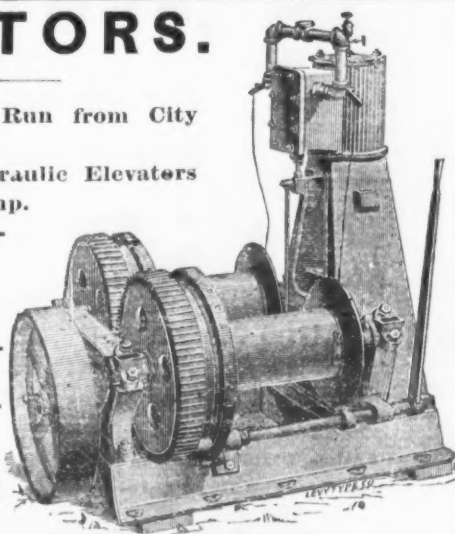
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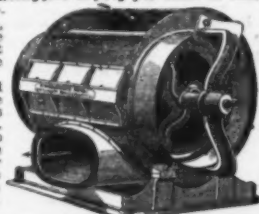
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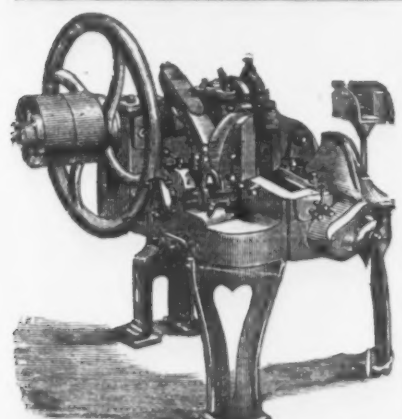


No. 0 threads	$\frac{1}{8}$ to $\frac{1}{4}$ inch.
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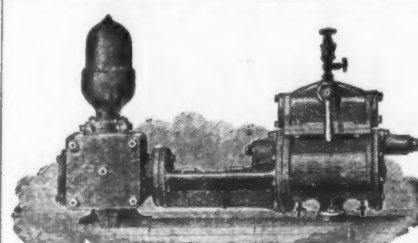
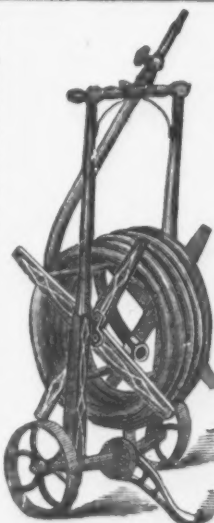


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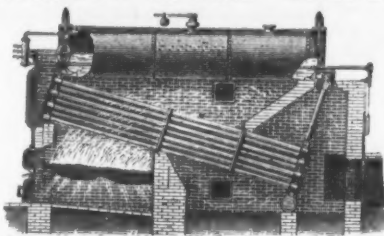
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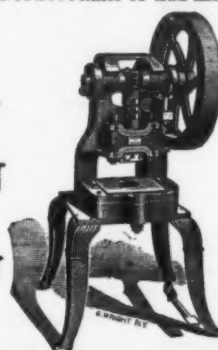
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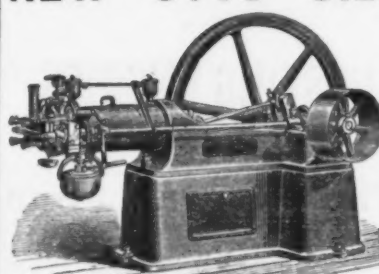


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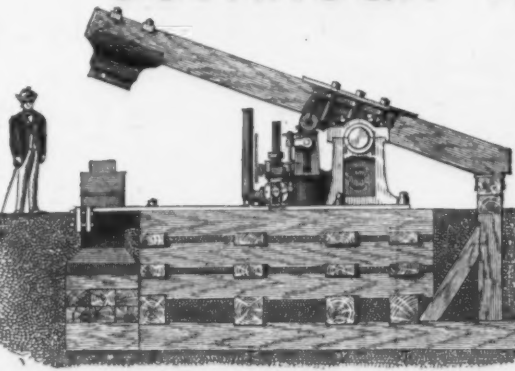
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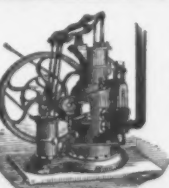
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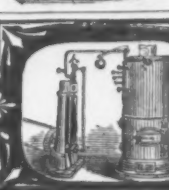
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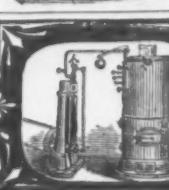
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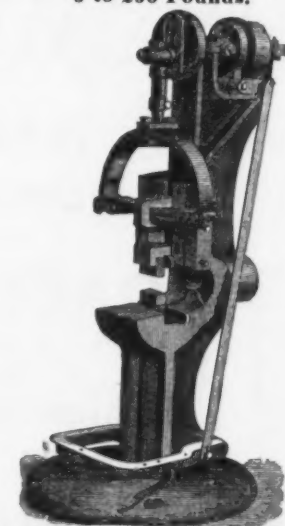
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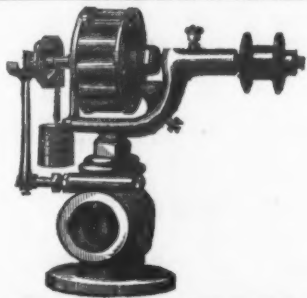
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2	33.00	37.00	3.25	9.00
2 1/2	36.00	41.00	3.50	11.00
3	40.00	46.00	3.75	12.00
3 1/2	45.00	52.00	4.25	14.00
4	50.00	58.00	4.50	17.00
4 1/2	54.00	64.00	5.00	21.00
5	60.00	70.00	5.50	25.00
5 1/2	66.00	76.00	6.00	31.00
6	72.00	82.00	6.50	37.00
6 1/2	78.00	88.00	7.00	43.00
7	84.00	94.00	7.50	50.00
7 1/2	90.00	100.00	8.00	56.00
8	96.00	106.00	8.50	62.00
8 1/2	102.00	112.00	9.00	68.00
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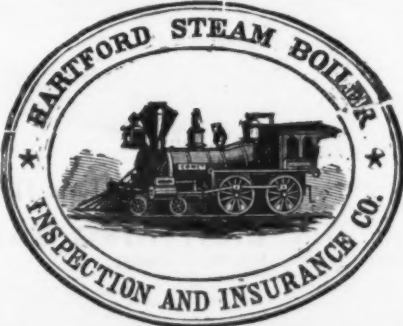


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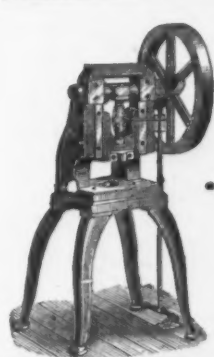
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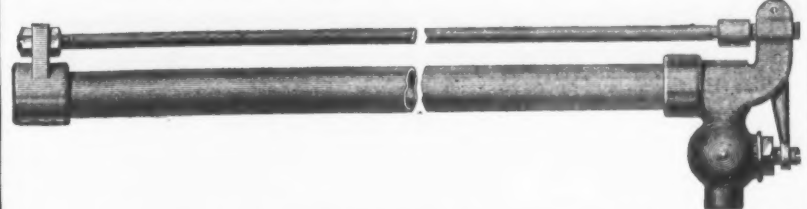
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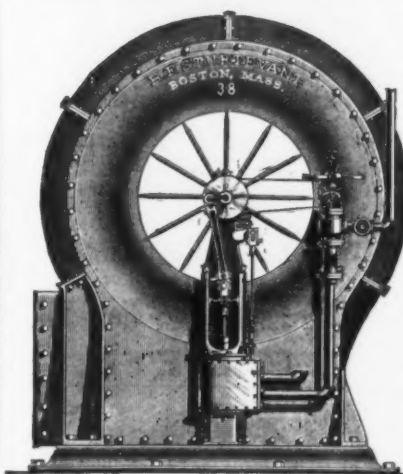
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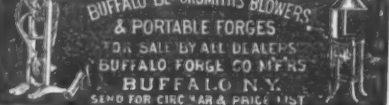
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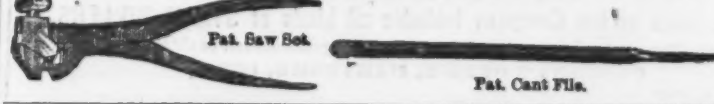
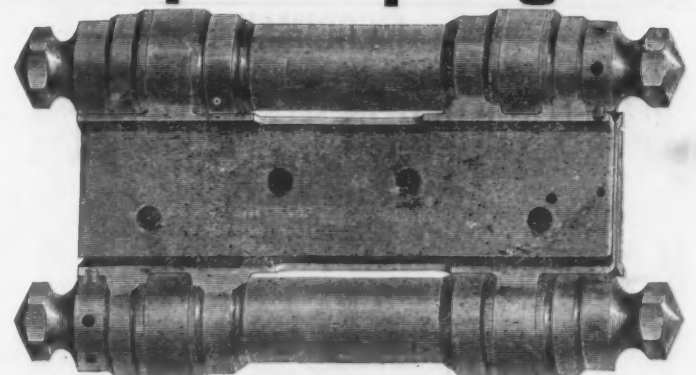
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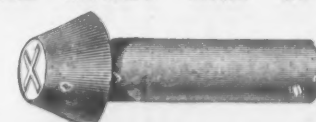
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